Vol. VIII. APRIL, 1918. No. 4.

APR 22 1918
UNIV. OF MICH. LIBRARY

AMERICAN JOURNAL of PUBLIC HEALTH

THE JOURNAL OF THE AMERICAN PUBLIC HEALTH ASSOCIATION

NEXT ANNUAL MEETING

OF THE

AMERICAN PUBLIC HEALTH ASSOCIATION

At Chicago, Ill., October 14-17, 1918

CENTRAL THEME: *The Health of the Civil Population in War Times*

PUBLISHED MONTHLY AT
10 DEPOT ST., CONCORD, N. H.

EDITORIAL OFFICE, 126 MASSACHUSETTS AVE.
BOSTON, MASS.

Entered as Second Class Matter at the Post Office at Concord, N. H.

No. 1420

General Laboratory Centrifuge

Our general laboratory centrifuge is of very heavy construction. It is completely enveloped in a protective dome that is an integral part of the centrifuge and of the same construction as the balance of the machine.

The machine is designed to permit the use of a large variety of centrifuge heads with all the various types of tubes usually used by such an apparatus. Its maximum capacity is eight 50 cc. tubes or eight Babcock milk bottles.

It is operated at five different speeds that are controlled by a rheostat that is a direct part of the machine and enclosed in the base.

No special wiring is necessary as the machine may be attached to any ordinary lighting circuit, either direct or alternating current.

The centrifuge, using a two 15 cc. tube head on direct current attains a speed of 4300 (on alternating current 4100) revolutions per minute, a higher speed than that developed by any other type of centrifuge of its kind now on the market.

The high power of the motor and its smooth running qualities, backed as it is by an absolute guarantee, make it the most desirable centrifuge made.

	For 110 volts	*For 220 volts*
Price without head or tubes,	$78.00	$81.00

Prices of various types of heads, tubes and other equipment quoted upon application

SCIENTIFIC MATERIALS COMPANY

PITTSBURGH, PA.

Everything for the Laboratory

American Journal of Public Health

Official Monthly Publication of the American Public Health Association
126 Massachusetts Ave., Boston, Mass.

APRIL, 1918 CONTENTS Vol. VIII No. 4

PAGE

How the Health of the British Army is Maintained 259
Col. George G. Nasmith, C. M. G.

Some Considerations Affecting the Replacement of Men by Women Workers 270
Josephine Goldmark.

Chicago's Tuberculosis Problem 277
John Dill Robertson, M. D.

Practical Standards for Factory Sanitation 288
George M. Price, M. D.

Report of Committee on Non-Resident Deaths 290
Wilmer R. Batt, M. D., *Chairman.*

Report on Registration Affairs 291
William H. Davis, M. D.

Hospital Statistics as an Aid to Public Health Administration—The Philadelphia Plan 293
Charles Scott Miller, M. D.

Standardization of Typhoid Vaccine 299
George W. McCoy, M. D.

The Need for a General System of Sanitary Supervision of Industries in Times of War 301
Emery R. Hayhurst, M. D.

Report on the Visual Acuity of the Members of the Corps of Cadets, New York Military Training Camp, Peekskill, N. Y. 304
Frederic A. Woll, Ph. D.

Viability of Coli-Like Bacteria with Concentration of Glucose and Lactose 306
Helen A. Burling and Max Levine.

Editorial—The Annual Meeting 308
The Sanitary Reserve Bill 309
Training for Public Health 310

RECEIVED FROM A CAPTAIN IN U. S. ARMY

"We marched 120 miles in six days, and on 2 days 19 miles without water, through a dessert, and your

'Horlick's'
Malted Milk
Lunch Tablets

were a Godsend."

From "Everywoman's World"—November, 1917, issue

"One lad who had been serving in the trenches for three years asks for more Horlick's Malted Milk Tablets. '*Please keep sending them*,' he says. 'They are handy to carry around and one in your mouth will relieve the terrible thirst, when no water is to be had.'"

Send Your Soldier Boy a Ration Tin of These Celebrated Tablets—They Invigorate and Sustain

At Druggists, 30c, or by mail, 35c

Also in sealed Glass Flask for Comfort and Hand Bags. For light lunch, relieving faintness. A digestible confection for children and ladies shopping or at home. Sent, postpaid, for 15c.

Horlick's Malted Milk Co.
Racine, Wisconsin

APRIL, 1918 CONTENTS Vol. VIII No. 4

Continued from Page V

NOTE SECTIONS

ASSOCIATION NEWS.—Next American Public Health Association Meeting in Chicago, 311; Meeting for Board of Directors, 311; The Membership Drive, 311; HELP WANTED, 311; Personal Notes, 312.

OFFICERS AND DIRECTORS, A. P. H. A.—313.

BOOKS AND REPORTS REVIEWED.—314.

PUBLIC HEALTH NOTES.—Plan to Save 100,000 Children, 316; Some Lessons from the Housing Problem in England, 316; Venereal Disease in Massachusetts, 317; A Popular Book in Household Biology, 317; Comparison of Draft Rejections, 317; Defective Development of Growing Children in War Time, 318; Serum Therapy in Epidemic Cerebro-spinal Meningitis, 318; Report of Mortality of Mothers in Childbirth, 318; Welfare Work for Infants in Belgium, 319; Welfare Work and Public Health, 319.

PUBLIC HEALTH LABORATORY NOTES.—Labeling of Microscopic Slides in Staining Technique, 320; Canadian Standard Methods of Water Analysis, 320; The Use of Large Quantities of Blood Serum in the Wasserman Reaction, 320; Microscopic Methods in Counting Bacteria in Milk, 320; Disinfection of Water with Calcium Hypochlorite, 321; Blood Charcoal as a Disinfectant of Small Quantities of Water, 321; Serum Veal Agar; a Dependable Substitute for Ascitic or Blood Agar, 321; Glycerin in Examining Feces for Typhoid Bacilli, 321; A New and Efficient Substitute for "Nutrose," 322; Value of Triple Typhoid Vaccine, 322; Contagious Period of Whooping-Cough, 322; Toxins Extracted from Tubercle Bacilli, 322; Serologic Test of Flour, 323; Sand Test for Typhoid Bacilli Carriers, 323.

INDUSTRIAL HYGIENE AND SANITATION.—Industrial Hygiene and the Doctor and the Health Officer, 323; The Lighting of Industrial Establishments, 323; Collective Agreements on Shop Sanitation, 324; Feeblemindedness and Industrial Relations, 324; A Sanitary Cuspidor, 324; A Novel Sand Blast Room, 324; Risk and Avoidance of T. N. T. Poisoning, 324; Minimum Wage Betters Industrial Welfare and Increases Profits, 325; Big Gain of Labor Output by Health and Safety Measures, 325; Labor Camp Conditions, 325; Hookworm Infection in Mines, 325; Pleurisy in Farm Workers, 325; The Dust Hazard in Certain Industries, 325; A Self-Supporting Industrial Dental Clinic, 326; More Mysterious Deaths Prove to be Gas Poisoning, 326.

Directing the Nutrition of the Normal Healthy Infant

is a problem that is coming before the physician more and more as one of the most important phases of preventive medicine.

The management of an infant's diet is not a difficult task—it simply means a supply of food elements that are necessary to sustain life and promote growth and a knowledge of some method of adjusting these elements to the individual condition.

The Mellin's Food Method of Milk Modification

meets the requirements in a scientific manner and offers the physician an opportunity to readily acquire a satisfactory solution of the problem.

Communicate with the

MELLIN'S FOOD COMPANY, BOSTON, MASS.

DePree's Formaldehyde Fumigator

is simply a rapid, convenient, economical method of liberating any required amount of formaldehyde gas in a room

Since all methods of formaldehyde disinfection rest primarily upon the same principle—that of the liberation of a certain amount of formaldehyde gas in a given space—it follows that the practical problem confronting any municipal health department, simply stated, is, "How can we generate the required amount of gas in the most rapid, efficient, convenient, and economical manner?"

DePree's Formaldehyde Fumigator is designed to solve this problem. Each fumigator is simply a compact little generator charged with a definite quantity of a standardized, non-secret, formaldehyde product, ready for instant operation. It requires no transportation of cumbersome apparatus. It involves no chemical reaction, with its attendant dangers and annoyances.

It is *not* the policy of The DePree Chemical Company to make specific claims of efficiency for its fumigators. We do not assert that a particular size is efficient in a room of given size. Each laboratory is invited to determine its own standard. Fumigators are made in several different sizes; it is obvious that within the limitations of Formaldehyde any required degree of efficiency may be obtained by simply increasing either the size, or the number of units, of fumigators.

This policy has demonstrated to over three-fourths of the Municipal Health Departments of the United States and Canada that DePree's Formaldehyde Fumigator offers more efficiency per cost unit than the old fashioned methods of Formaldehyde disinfection.

The DePree Chemical Company

CHICAGO, ILL.

Laboratories: Holland, Mich.

American Journal of Public Health
Official Monthly Publication of the American Public Health Association
126 Massachusetts Ave., Boston, Mass.
Vol. VIII APRIL, 1918 No. 4

HOW THE HEALTH OF THE BRITISH ARMY IS MAINTAINED.

COLONEL GEO. G. NASMITH, C. M. G.,
Director of Laboratories, Department of Health, Toronto. Formerly Advisor in Sanitation, etc., with First Canadian Contingent, and for Eighteen Months Officer Commanding the Canadian Mobile Laboratory in France.

Read before the American Public Health Association, October 20, 1917, at Washington, D. C.

THE history of war has always been a history of epidemics. The very fact that in an army men are crowded together makes it easy for all communicable diseases, once introduced, to spread with great rapidity. And because soldiers are always associated with the civilian population, it means that such diseases are rapidly communicated from the army to the civilians; and from the civilians to the army. It is therefore apparent that during a war, disease, unless checked quickly, may run like wildfire through a country, and be disseminated far and wide by soldiers returning to their own homes, or other places while on leave.

It is necessary first to understand the nature of the medical organization of the British Army, and this will be better understood perhaps by following a wounded or sick soldier through the system from the front line to the base hospital.

The medical officer of a battalion has his regimental aid post somewhere close to the front line, in a cellar or dugout, but usually in the trench itself. Each day he holds a sick parade and men who are, or imagine they are, sick, come to him for advice and treatment. Working under the M. O. of the battalion are the regimental stretcher-bearers who bring in the wounded. Soldiers who are only slightly wounded, or are not too sick, after being given suitable treatment by the M. O., make their way back to the advanced dressing station.

This advanced dressing station is really an advanced section of the field ambulance, and is manned by officers from the field ambulance, who also have under them a squad of stretcher-bearers. The dressing station is usually located in some battered farmhouse, cellar or dugout, on or near a road and within a mile or so of the trenches. This enables the stretcher-bearers from the advanced dressing station to bring in those unable to walk from the trenches; it makes it possible also to evacuate at night by motor ambulance,

the sick and wounded collected during the day. Very frequently also, narrow gauge railroads are used for the purpose of rapidly bringing in the wounded to the advanced dressing stations.

From the advanced dressing station the sick or wounded soldier, after any necessary preliminary attention, is taken to the field ambulance which is usually located in some large building three or four miles behind the line, where he is further attended to, ticketed with his diagnosis, given antitetanic serum if he has not already had it, and sent on by motor ambulance convoy to the casualty clearing station.

At the casualty clearing station, of which there are usually three or more together in a town, the men are again gone over, their wounds redressed, operations performed, and all the work of a hospital carried on. The towns in which the C. C. S.'s are located are situated usually out of practical gun range, on railroads and frequently on canals so that the wounded may be readily evacuated by train or barge to the base. These casualty clearing stations are arranged in groups so that when a battle is raging one hospital receives the wounded until completely filled up, while the other hospitals, which were filled perhaps the day before, are treating their wounded and evacuating them to the base.

The General or Base Hospitals are located scores of miles to the rear; on the seacoast where facilities are provided through hospital ships for the evacuation of the sick and wounded to England.

In addition to these medical units mentioned above, there are rest stations or convalescent homes behind the lines, where tired, "fed-up," and mildly shell-shocked men and officers are looked after and allowed to rest until fit to return to duty.

It is also necessary to realize that in the temperate climate of Europe the vast majority of communicable diseases of importance from the military standpoint are contracted largely from three sources:

Group 1. Directly from throat and nose secretions; this includes practically all of the ordinary diseases like measles, mumps, whooping-cough, influenza, colds, pneumonia, scarlet fever, diphtheria, etc.

Group 2. Directly from biting insects; *e. g.*, malaria, typhus fever, plague, etc.

Group 3. Indirectly through intestinal secretions containing the germs of typhoid fever, cholera, dysentery, etc., gaining access to the body through contaminated water, food and flies.

With this outline in mind it is easy to see that it is possible for such diseases to be held in check, provided that the sanitary and medical organization is such that the germs from one infected soldier can be prevented from reaching another.

It is obviously essential in the first place to remove from the army, at the earliest possible moment, every case of communicable disease after it has been diagnosed. This means that there must be some means for picking out soldiers who show symptoms of disease, which really comes down to the fact that medical officers must always be on the alert and carry out the instructions of the director of medical services

of the army, with despatch; in the British Army this is one of the very important features in the control of epidemics. If a man is suspected of having any communicable disease he is instantly placed under quarantine until the diagnosis has been confirmed, after which he is removed from the army area altogether, as a possible focus of infection.

This method is practically the only means of eliminating diseases such as measles and scarlet fever which cannot be diagnosed by bacteriological methods, but of course the procedure is employed in all other kinds of communicable disease.

Great Britain has been fortunate above all other nations in this respect, that she sent over at first a small army of regular troops, perfectly equipped from the medical standpoint as well as in every other way. Efforts had been made for years to remove typhoid "carriers" from the regular army, and naturally no soldier was sent into the field who was known to have, or to be a "carrier" of, any contagious disease. Furthermore, the soldiers had practically all been vaccinated against smallpox and inoculated against typhoid fever.

As division after division was sent out to the army in France, they too were completely equipped with sanitary squads, casualty clearing stations, field ambulances, water carts, and other necessary medical equipment. Consequently as the army grew and expanded into a huge force it was thoroughly equipped, not only with the necessary apparatus for caring for the sick and wounded, but also with the experience acquired by those already in the field. In this way the British Army differed from all our European Allies which had been compelled to mobilize everything at once and found themselves woefully lacking in medical equipment and personnel.

It can be readily seen that the British Army began under auspicious circumstances, and that thereafter its freedom from contagious diseases depended to a great extent on the preventative measures adopted.

All excreta behind the front line and reserve trenches is destroyed in numerous incinerators which are kept burning night and day. The British Army is the only army which has succeeded in doing this. All other excreta which cannot be burned is buried so that it cannot be reached by flies.

It is the rule to sterilize all water used for drinking purposes, either by boiling, by bisulphate of soda, or by chlorine. The method of chlorinating water on a small scale in general use in the army, as it is in all of the other allied armies, was brought to the attention of the British Army authorities by the publication of a method evolved by the writer in 1909. This was particularly useful in the trenches where it was possible to accurately sterilize a pail or a barrel of water if necessary. Small tablets of hypochlorite of lime, each one sufficient to sterilize a pail of water, were also ordered and issued to the first Canadian division, and proved useful.

The great bulk of the water supply, however, is sterilized directly in the water carts by adding one or two spoonfuls of the dry chloride of lime

to the partly filled water cart, the mixing being done by the addition of the rest of the water and by the agitation during the trip back to the place where the cart is stationed.

In addition to this, large mobile filter units after a plan draughted in 1914 and officially suggested by the writer in 1915, after experience in the field, were adopted throughout all the British armies. The mobile filters are capable of filtering and sterilizing large quantities of water and delivering it to water carts or into standpipes, ready to drink. A check is kept on the efficiency of the filtration by mobile field laboratories.

In each division there are some sixty water carts, each of which holds about 110 gallons. We attempted to get samples from all of these in turn, to see whether the water had been treated. As all the sources of water supply in Flanders, with few exceptions, contain large numbers of bacteria, and as a properly chlorinated water contains very few bacteria it was easy to tell from the bacteria and B. coli tests whether the water in the carts had been chlorinated; and these simple tests were adopted as a routine method of control. As we sometimes had eight divisions in our area at one time, this water control meant a good deal of work. The water carts were usually to be found at the headquarters of the unit to which they belonged, and we quickly discovered that the way to get the largest number of water samples in the shortest time was to travel by the map up and down the twisting narrow roads.

Reports of all samples were sent to the A. D. M. S. of the division, who forwarded them to the medical officers of the units, with more or less caustic remarks should samples be bad. The M. O. in turn would get after the man in charge of the water cart, who usually had some more or less plausible excuse. The water details of the first Canadian division were the best trained lot of men we ever ran across. The very first day we took samples from their water carts five weeks after the arrival of the Canadian division in France they were all sterile, and there were no complaints about taste. It was an excellent example of what training could accomplish, for they all had been carefully trained in their duties in Canada and England. As the water details of any division are constantly changing, the efficiency of the treatment depended to a great extent on the constant supervision of the problem by the A. D. M. S., medical and sanitary officers.

We have found divisions coming into our area for the first time with only 25 per cent of their water carts chlorinated, whereas before they left they would have 90 per cent or more chlorinated, and the division thoroughly educated as to the necessity of carrying out this process of sterilization properly.

Wells, springs, creeks and ponds were also examined, and not infrequently samples from "springs" encountered while digging new trenches were sent in to be tested. The tremendous number of bacteria found in some of these "spring" samples we have on several occasions reported as indicating the presence of some buried animal matter in the immedate vicin-

ity of the springs, and have resulted in finding these surmises to be correct. In one case in which a badly polluted water was reported upon, the burial place of some fifty Germans was found to be only a few feet distant.

Standing orders forbid the use of unboiled milk in the army, as well as uncooked vegetables, so that there is little danger from these sources. When one sees the peasants watering their vegetables with fresh house sewage, the reasons for such regulations are apparent.

As it is possible for flies to carry typhoid bacilli and other disease germs from excreta to food, a constant war is waged against these filthy insects, and it is the duty of everybody concerned to see that all manure piles in the army area are gotten rid of. On the other hand, food is screened from flies whenever possible, and privy pits made inaccessible to them by the same means. On the whole, the house-fly has not yet, in so far as we know, played any great part in causing epidemic disease in the British Army, though both the house-fly and lice have been accused of carrying the organisms responsible for trench fever.

Mosquitos are responsible for transmitting malaria and yellow fever, though the latter never occurs in Europe. Malaria in France is also comparatively unknown, though we found the anopheles mosquito responsible for transmitting this disease, everywhere.

There were also numerous cases of malaria recurring in soldiers from India, Egypt, and other hot countries, so that we had both the infected individual with the malaria parasite in his blood, and the mosquito which was capable of carrying the organisms. Yet in 1915 we only had a dozen cases of malaria develop in men who had never been out of England, and were therefore, presumably, infected in France.

Typhus fever is one of the most dreaded diseases in the army. As yet there have been no cases of typhus fever in the British army in France, though it has occurred to a greater or less extent in Germany, Austria, Russia and Serbia. The quarantine services of the countries bordering on the Mediterranean have prevented it spreading to any other country through ships.

Typhus fever is known as a dirt disease, and its control is through the plentiful use of soap and water.

As every soldier in the field becomes more or less lousy, a persistent and continuous fight against this variety of vermin must be kept up, for lice are not only a potential source of danger in transmitting typhus fever and relapsing fever, but they are a great source of irritation to the men and responsible for much loss of sleep.

Hot baths are provided on every divisional area on the British front. Three or four miles behind the trenches in the rest areas, in places where a plentiful supply of water can be obtained, the army has established bath-houses. Sometimes a brewery, or part of it, has been taken over for this purpose, because the breweries all have deep wells from which a plentiful supply of water can be obtained. If the bath-house is in a brewery they may utilize the large beer barrels cut

in two for baths. These are filled with cold water and live steam turned into the water to warm it for the men's baths. After the bath the men dump the barrels, which are immediately refilled by the attendants, for the next lot.

Most of the bath-houses, however, are in shacks built upon the edges of creeks or ponds. The water is pumped into an elevated reservoir and heated, frequently by means of a threshing machine boiler rented or purchased from some neighboring farmer. One section of the shack is divided off for a bath-room with a number of showers, and the other rooms devoted to the receiving of dirty clothing, storing of clean clothing, washing, drying, and sterilizing.

The waste wash water from the baths and laundry entering the creeks naturally causes trouble for troops downstream who have to use it for any purpose. Horses particularly will not touch soapy water, and the brewers object to making beer with it; they say it spoils the beer.

Consequently the sanitary officers have in many cases been compelled to put in tanks to treat this dirty water and purify it. This is usually done by adding an excess of chloride of lime, which precipitates the soap as a curd, carrying the dirt down with it. By sedimentation, and filtration through canvas, cinders and sand, the water is clarified and turned into the creeks again clean. Here the laboratory proved to be quite useful in helping the sanitary officer and engineer work out their methods of purification.

Summary of Sanitary Methods in Use.

By getting rid of cases of intestinal disease, "carriers" of intestinal disease, by destruction of excreta and garbage, screening of food, destruction of breeding places of flies, sterilization of drinking water, boiling of milk and vegetables, and in the case of typhoid and paratyphoid fevers, inoculation, the chances of intestinal disease germs getting through from one person to another are comparatively small, as the results indicate.

To show that the freedom from intestinal disease in the British Army is not due to accident, one example will serve to demonstrate. Early in the war, when the British took over from the French a section of the line in the Ypres salient, the Belgian population in the little village of Vlamertinge and neighborhood was being devastated with typhoid fever, and the French troops also had a good many cases. When the British troops took over the line they not only escaped getting typhoid fever themselves, but they succeeded in absolutely stamping it out from among the civilian population, and in getting rid of any "carriers" of the disease.

These cases were discovered by a house-to-house investigation by "The Friends' Search Party"—a group of Quakers who had conscientious scruples against bloodshed. This search party notified the medical authorities, particularly the laboratory in the area, of any doubtful cases, and the diagnosis was then made where possible by laboratory methods. In the last six

months of my stay in France, near the Belgian border, I do not think that the Friends' Search Party unearthed a single case of typhoid fever, and as a matter of fact few cases of the ordinary epidemic cases such as measles or diphtheria were discovered, although the party continued to make house-to-house investigations and report to us regularly.

All of the bacteriological and hygiene work for the various ambulances, casualty clearing stations, rest stations, medical officers, sanitary officers and even veterinary officers in the area is done by the laboratory.

From this sketch of the organization of the medical service, its arrangement, the diseases which must be controlled and the sanitary methods in use, it may be seen how and why a laboratory can well fit into the system.

The mobile laboratories are usually established near a group of casualty clearing stations, for which they do the necessary clinical laboratory work as well as bacteriological work. In connection with each group of casualty clearing stations there is usually one section of one casualty clearing station used as an isolation hospital, to which are diverted all the cases or suspected cases of contagious disease. Naturally the laboratory is called upon to confirm the diagnoses made in such cases.

Most of the routine bacteriological work of the laboratory is of much the same nature as that of a health laboratory at home, and consists of examinations to detect cases or carriers of the ordinary communicable diseases such as diphtheria, cerebro-spinal meningitis, typhoid fever, malaria, dysentery, tuberculosis and venereal diseases.

Should a case of diphtheria for example be found in a soldier, all of his immediate friends and companions with whom he had been in contact would be swabbed to see whether they were infected. Those found to be infected would be removed from the army at once.

In a case of suspected typhoid fever, the examinations of serum, blood and excreta would be made. If found to be a case of typhoid fever the laboratory would be called upon to try to discover the source of the infection. The same general methods hold in other epidemic diseases where a laboratory is capable of making the diagnosis, to discover whether danger lurks in "contacts" or "carriers" and to find the source of the infection where possible.

Very frequently material from wounds is sent in by the hospital surgeons, to see whether wounds are infected. The soil of Flanders has been liberally manured for hundreds of years, and in every cubic yard of this manured soil there are apparently millions of the germs which cause gas gangrene and tetanus when introduced beneath the skin. If a wound is infected with the germ causing gas gangrene or with other dangerous organisms, the knowledge that they are present may materially modify the treatment used by the surgeon, and the laboratory is sometimes of value to him in determining that point.

The varied nature of laboratory work in the army and its practical applications may perhaps be better appreciated from some typical examples.

One day the officer commanding a hospital sent to us a pint of tea suspected of poisoning 28 out of 29 men

who drank it. From the history of the affair we did not believe that the tea could possibly be the cause, and after making a few rapid tests to exclude metals we proved that the tea was not poisonous by the simple practical test of drinking it,—Major Rankin being the official tester. The report of our physiological test rather astonished the British authorities.

A German gas mask found on the battlefield was submitted to us to find what chemicals were present. That mistakes were sometimes made by the Germans was quite evident when we found that the mask had not been treated with chemicals at all; some of the Huns at least had been unprepared for a gas attack.

The clarifying apparatus connections of the water carts frequently broke in certain definite places. Recommendations were made by our laboratory, after experimentation with rubber instead of rigid connections, which resulted in all of the carts in the British Army being equipped with rubber connections, and consequently in improved efficiency.

A great deal of experimental work was done with chlorine gas and the efficiency of gas helmets. Experimental physiological and pathological work was done on animals with chlorine and other gases; work on the drying out and deterioration of gas helmets, and the chemicals used in them, was also carried out.

Quite a number of cases of nephritis occurred among soldiers, and arsenic was suggested as a possible cause. We were therefore asked to examine a considerable number of samples of wine and beer to see whether traces of arsenic were present or not. None was found. A large quantity of wine found to be diluted with ditch water, and sold to our soldiers, was destroyed and the vendors fined.

One day a young medical officer, so excited that he could hardly speak, rushed into the laboratory with a lot of dead fish. After some questioning we found that there were tens of thousands of dead fish in the Aire-La Bassee Canal, and as this ran through the German lines he suspected that the canal water had been poisoned. We told him that we thought the fish had probably died from asphyxiation as a result of organic matter being dumped into the stream. He went away unconvinced but returned later in the day to report that he had discovered that the fish in the canal died every year when a certain distillery dumped certain waste material into the canal. Thus did our old experiences with starch mills dumping their waste into Ontario streams, and killing fish, prove of unexpected use.

The laboratory was used a great deal by the highly trained officers of the Indian Medical Service, who were always wanting some unusual insect or parasite identified, and made a good deal of use of our little working library.

A soldier died suddenly one day without any preliminary symptoms. It was thought that it might be due to poison, and if a case of suicide his wife would have been deprived of her pension. We were asked to examine the stomach contents to decide whether poison was present or not, but no poison was found.

A little vial found beside a dead German and containing a small amount of material was sent in for us to determine the nature of the contents. It proved to be opium, and the owner had evidently been prepared for a painless passage across the Styx whenever such necessity should arise.

Occasionally we had to investigate possible causes of cholera among troops coming from India. One day we received a long telegram to proceed to a certain village about ten miles away and report on the sanitary surroundings and particularly on the water supply of a place where an old Frenchman had died of "choleric dysentery." We found the house after some search and discovered that the old man had died a month before, and that the suspected water supply, unboiled, had been used since that time, by a certain headquarter's staff,—without ill effects. Needless to say this was the best proof obtainable that the water supply was safe.

Another unusual problem arose out of the fact that several soldiers had contracted anthrax, both in England and in France, and the shaving brushes issued were suspected of being the cause. We undertook to search for anthrax spores, but found it was too long and tedious a job for a field laboratory, for the brushes were full of spores of all kinds. Later on in England anthrax was actually found in some of these brushes, according to reports since published.

These few examples taken at random will serve to demonstrate the varied character of the work of a field laboratory, and to show that a certain amount of experience is necessary in order to effectively handle some of the problems constantly arising. We were peculiarly fortunate in our combined experience. Major Rankin, a first-rate pathologist and bacteriologist, had been in charge of the government laboratory at Siam for five years previous to the war, and knew tropical medicine like a book, while Captain Ellis had worked for three years in the Rockefeller hospital laboratories in New York, and was thoroughly conversant with recent work in serum diagnosis and therapy. Consequently between the three of us there was little we could not tackle, either in bacteriology, pathology, sanitation or treatment of epidemic disease.

Whenever an action was about to occur on the front the hospitals were evacuated of all sick and wounded in order to obtain the maximum number of beds. Consequently when fighting was going on the hospitals were very busy with surgical cases but the laboratory routine greatly decreased because there were few sick. We therefore undertook investigations of various kinds, to keep busy and be of the greatest amount of use.

At the suggestion of the D. M. S. of the army, Major Rankin made a survey of the army area for Anopheles mosquitos. The Indian corps was in our area at the time, and he obtained the coöperation of the officers of the Indian medical service, who, being particularly keen on biting insects, collected many specimens for him. In spite of the Anopheles mosquito being found everywhere, Major Ran-

kin reported that he did not believe there would be much malaria, and such proved to be the case. Major Rankin also made an extended investigation with one of the physicians of a C. C. S. into the cause of trench fever and although the results were largely of a negative character it cleared the ground for other workers along the same line.

Captain Ellis began an investigation into the grouping of the various strains of "meningococci"—with the ultimate object of obtaining a more potent anti-serum in the treatment of cerebro-spinal meningitis. He also carried on work relative to the cause of trench nephritis.

Apparatus designed to purify wash water from baths before turning it into the streams, the building of small chlorinating plants near the trenches, and the construction of field incinerators for consuming garbage, were referred to us for consideration and suggestions, so that we had a variety of sanitary work of an interesting and useful kind, which helped to keep us busy.

The nature of our activities carried us through the area of shell fire, among the batteries, and sometimes quite close to the trenches. We were more or less free lances, and in travelling about in the course of our work we saw everything in one sense, more or less from the spectator's standpoint.

Many sad and depressing sights were witnessed, and one got an impression of what war means to an invaded country, such as can only be attained by actual experience. Quite frequently refugees were crowded together with their countrymen who had given them shelter, with disastrous results.

Accompanied by the sanitary officer of the 19th division, one morning, I saw a very sad example of what ignorance of the laws of hygiene can bring about. Down on a swampy spot, on a branch of the canal, was a little hamlet, and one of the tiny houses was occupied by a family of refugees from La Bassee. When we entered the house, swarms of flies flew up from the table and buzzed about while we did our best to prevent them from settling upon us.

The father of the family was in bed, unconscious, with typhoid fever. The mother, dead from the disease, had been buried the day before.

During the funeral the eldest daughter, a pretty girl of sixteen, sat up in a chair trying to look after the visitors. When we called she was also in bed delirious with the disease in the same room as her father. The baby in the carriage had had typhoid fever. A little two-year-old boy was just recovering, and was thought to have been the original case. The other boys of seven and nine years of age were getting some bread and milk for their dinner, one of them being probably a mild case; and a girl of eleven, evidently coming down with the disease was going about looking after the household. With that swarm of flies in the house there was no possibility of any of them escaping infection. It was with the greatest difficulty that the sanitary officer of the division succeeded in getting the cases removed to the French civilian hospital. The father died a week

later, and the sanitary officer himself was subsequently killed during the battle of the Somme.

The best indication of the efficiency of the medical service of any army after all is its record of cases and deaths from preventable causes. The record of the British Army in France from this standpoint is a remarkable one, and a magnificent example of what applied bacteriology, sanitation and hygiene have been able to accomplish.

◈

The Dispensary in Public Health Work.—Mr. Michael M. Davis, writing in *The Modern Hospital* on the dispensary as a factor in public health work, calls attention to the development of the dispensary from the time in the seventeenth century when it was a "medical soup-kitchen," merely dispensing medicine to the poor, down through the period when medical advice began to be furnished, until at the end of the nineteenth century it really became a factor in public health work.

The new public health function of the dispensary had its inception in the antituberculosis movement and finds an increasing development in "well-baby clinics," pre-natal and obstetrical clinics as well as in dental and other clinics of the school period. Another and a most important type of clinic bound to come to the fore in wartime is the dispensary for venereal diseases.

The general dispensary or out-patient department, according to Davis, has large opportunities for preventive work because it reaches disease in its early stages; because it can treat minor diseases rarely taken to a private physician and yet requiring treatment if more serious affections are to be avoided; and because it can supervise the convalescence of hospital patients. And withal, it has the opportunity to teach as well as to heal.

The essential need of a social service department in the dispensary is strongly emphasized.

(*M. E. C.*)

✦

Venereal Diseases in the Army.—1. During the twelve weeks ending December 7, 1917, there were reported from 31 cantonments 21,742 new cases of venereal disease. The incapacitation of these men involves not only loss of time; in addition, it has cost the government to keep them during the period of hospital confinement (which varies from one to eight weeks) more money than is required to maintain the entire command at Camp Dix (the cantonment in New Jersey with 20,859 men), plus an additional sum for medical treatment.

2. This is not all. Inevitably the disease will relapse in hundreds of these cases, in many instances after the men have been transported to France and presumably put into condition for service at the front, at a cost to the nation of probably $1,500 for each man.

3. The important fact in this connection is that a large proportion of venereal disease cases originate, not in the camp or in communities surrounding the camp, but in cities and towns from which the men come and through which they pass on the way to camp. Reports from the Surgeon-General's office show this. The enormous cost to the government on account of venereal disease is due largely, therefore, to conditions in civil life.

4. A study of the above facts shows an urgent need for an organized attack simultaneously by all states on the problem of venereal disease. When only a few states deal with the problem spasmodically, the result is to drive the principal carriers (prostitutes) from one state to another. State Boards of Health in each state, therefore, should now enlist the coöperation of state councils of defense, governors, mayors, chiefs of police, police judges, district attorneys, city attorneys, superintendents of hospitals and educators in an organized attack on these diseases.—*Florida Health Notes.*

SOME CONSIDERATIONS AFFECTING THE REPLACEMENT OF MEN BY WOMEN WORKERS.

JOSEPHINE GOLDMARK,
Publication Secretary, National Consumers' League, New York City.

Read before the Industrial Hygiene Section, American Public Health Association, October 19, 1917, at Washington, D. C.

AMONG the many new and urgent problems of industry in wartime, none challenges our best thought more sharply than the replacement of men by women workers. This movement which has gone far abroad, is still in its infancy in this country; yet it is not too soon, it is, indeed, high time to gauge the tendencies and consequences of so radical a change. The replacement of men by women, proceeding in many industries and occupations in every state of the union, must of necessity react for good or for ill not only upon the girls and women so employed, but upon far wider circles, upon their families, their children, and upon the whole standard of living of their communities.

In this country it is too soon as yet to hazard an estimate of the numbers of women who are entering upon new occupations and taking men's places. The number of the women so employed is not yet numerically great; their employment is in many cases still experimental, but we are undoubtedly on the threshold of great innovations. Girls and women as messengers and elevator operators, as section hands and towermen on railroads, running drills and presses, working in powder-mills and sawmills, cleaning the outsides of railroad coaches and wiping engines, in the machine shop, in the munitions plant, in the airplane factory—these are some of the new figures in industry.

BENEFITS OF THE CHANGE.

Among the benefits from the new widening of women's employment one of the most important is the breakdown of prejudices. Women have in the past been hampered in advancing industrially by the prejudices of both employers and their fellow workmen, organized and unorganized. Women's sex and inexperience has been made the excuse not only for all manner of exploitation but for the refusal of employers to advance them to positions of responsibility and trust. One of the triumphs of women's wartime employment in England has been their response to opportunity: the intelligence and the speed with which they have reacted to instruction in intricate new work such as the manufacture of aero-engines and guns as well as in the simpler operations of making shells, fuses, hand grenades, etc. This is the universal testimony: to the unbounded surprise of all, women have proved their ability to enter upon and succeed in work hitherto closed to them on the sole ground of their sex.

And this success has been a triumph not only for women workers, but for

the new methods of instruction in industry. Instead of the old rule of thumb and the mere copying of fellow workmen by apprentices and new workers, there has been intelligent direction of the working women newly introduced into the workshops of England. Mr. Granville Baillie of the British Ministry of Munitions, at a conference on Women in Industry in London last May, told how the new training had enabled working women to surprise the world by their achievements in industry, by the speed, the accuracy and the responsibility with which they have mastered their new trades. The training has been most successful when carried on in the plant where the women are to work. Under the British Ministry of Munitions, training schools were established with a view to giving untrained women some general technical instruction for the simpler processes in the engineering and chemical trades. This has been best carried out in the individual shop rather than in technical schools.

Throughout the world women are entering these new fields. Between July, 1914, and January, 1917, the number of women gainfully employed in Great Britain had increased by almost one-third. According to the London *Labour Gazette* of August, 1917, 1,256,000 women are directly replacing men.* In Germany the number of women employed in metal trades alone in July, 1916, is reported to have been over 3,000,000. In France the Minister of Munitions stated just a year ago that 300,000 women had gone into munition works; from Italy it is officially reported that the number of women employed in munition works in Lombardy has risen from over 4 to about 10 per cent of the total number of employes.†

Undoubtedly in this country many promising fields are opening for women from which they have been debarred and for which they are well fitted. Such are the new positions in many branches of the railroad service; for instance, as freight checkers, as ticket agents, and as information clerks, weeding and clearing the tracks; in banks and financial houses; in cost and production departments; as floor walkers in stores; as clerks in shoe stores, etc. In machine shops women are found to excel men at inspecting and testing and other operations requiring dexterity. In many instances, too, women are now receiving far higher wages than ever before for work no harder than women's traditional exhausting labor of scrubbing floors during long hours in dampness and wet. Yet, granting all that promises from such gains, no one can view without alarm the indiscriminate employment of women which is in process or impending in such heavy work as glass making, in some of the processes of steel mills exposed to extreme heat, as ballast tampers or freight handlers on railroads, as pilers of lumber and loaders of scrap iron, or in the bleachery pits of cotton mills,—to mention

* Monthly Review of the United States Bureau of Labor Statistics, October, 1917, p. 41.

† Child Labor in Warring Countries. A Brief Review of Foreign Reports. Industrial Series No. 4. The Children's Bureau. United States Department of Labor, pp. 12, 13, 14.

some of the occupations most needing scrutiny and care.

Evils Needing Scrutiny.

If the achievements of women workers challenge the world's admiration, we cannot neglect the obverse side of the picture. We have not yet learned the cost, the wastage of woman power.* There is no doubt that both abroad and in this country unmistakable dangers are inherent in many of the new occupations. Some indeed are totally unfit for women; some may be rendered fit by changes in method of management; in all of them the indispensable prerequisite is a new scrutiny of the workers and the effect of the work, a kind of intelligent supervision known hitherto in only a very small number of the most enlightened establishments but needed now wherever women are employed in new lines of activity if we are to preserve our national energies.

Lifting Excessive Weights.

Of the specific dangers to be guarded against, one of the most obvious is the lifting of excessive weights. This has long been recognized as a source of injury for women. In no occupation hitherto engaged in have the chances of physical harm from lifting excessive weights been greater than, for instance, in the proposed employment of women in railroad freight yards. One road which has contemplated such a step, stated that the weight of goods to be lifted would run up to 100 pounds. No argument is needed to show that such work, continued through the day, is unfit for women and should be totally prohibited. It is true that in laundries, another traditional employment of women, women are expected to lift bundles often weighing more than 100 pounds. This is undoubtedly a source of physical injury; in freight yards such burdens are not an occasional part of the work but constitute its main part. In one railroad yard girls themselves weighing not more than 115 pounds, were found wheeling metal castings in wheelbarrows up and down inclined planks and loading them into the cars.

A recent report from Germany shows that among women employed in the metal trades heavy lifting is a main cause of physical injury. The inquiry covered over 2,500 establishments employing more than 266,000 women and girls, an increase of 319 per cent over the number employed before the war. Projectiles weighing from 22 pounds to 82 pounds have to be raised breast high from the floor and clamped down, then unclamped and placed again on the floor. According to this report, given in *Soziale Praxis* of April 19, 1916, there is great complaint of abdominal trouble among the women who raise these weights. In one establishment which required very hard muscular work, it is reported that nearly a third of the 42 women employed "have been disabled by illness."†

Clearly, in any occupation which requires heavy lifting, as for instance in corerooms, a maximum weight

* See Women's Industrial News, London, July, 1917.

† Monthly Review of the United States Bureau of Labor Statistics, September, 1917, p. 84.

should be set. In New York State a maximum of 25 pounds has been fixed by law regulating women's work in foundries. A maximum of 25 pounds in lifting weights was adopted also in the valuable standards formulated by the Executives' Club of Detroit last spring representing 40 of the largest industrial plants in that city.*

The establishment of a maximum weight in lifting is obviously a rough measure of protection. In all occupations safety lies only in the physical examination of all prospective workers, or better in the medical supervision of workers, as Doctor Schereschewsky has well phrased it in a recent address.† For some women doubtless even 25 pounds is excessive, when lifting constitutes a large part of the day's work. The relation of the lifted weight to the chest and abdomen circumference, the total physical condition of the worker, should be determining and can be settled only by a medical examination before employment.

Industrial Poisoning.

Another obvious danger calling for close observation in some of the new occupations is that of industrial poisoning. Thanks to Bulletin No. 219 of the Federal Bureau of Labor Statistics by Dr. Alice Hamilton, we have knowledge of the extent and nature of industrial poisoning in the manufacture of high explosives, so far as it could be ascertained by investigation of the first order. In this country women have not yet been employed in large numbers in the manufacture of TNT, in filling shells, or in those nitration processes whose victims show the same symptoms, suffer and die exactly as do the victims of gases in trench warfare. Yet it is known to the writer that in precisely one of the worst conducted TNT factories, where the sanitary precautions are nil and the TNT is allowed to cover the ground, the workroom and the workers themselves, women are among the operatives. As the manufacture of explosives grows by leaps and bounds in this country, and new gases are developed and manufactured, as other poisons are increasingly used such as the various dopes for airplane wings, women will increasingly be employed in these dangerous processes. As a sex they are known to experience more serious injury than men from such an industrial poison as lead. This may be true of other industrial poisons not yet studied. Safety here lies only in the enforcement of sanitary precautions, in periodic medical supervision, in the shortening of hours of labor and in the prohibition of night work for women.

Overfatigue and Nightwork.

In all of the new occupations as in the old, too much emphasis cannot be laid upon the factor of fatigue in predisposing to illness and exhaustion. It did not need the well recorded wartime experience of England to teach us that output together with health and vigor fails when hours of work are excessive, when Sunday work is permitted and rest at night broken. Yet within the last year even the enlight-

* Industrial Management, August, 1917.

† Public Health Reports. Reprint No. 234, November 20, 1914.

ened State of Massachusetts, the pioneer in labor legislation and for twenty years the leader in prohibiting night work for women employed in factories, has under the plea of war emergencies reëstablished night work and overtime by special permit to specified establishments.

It is well known that the greatest efforts have been needed to prevent the breakdown of labor laws in many states and the reëstablishment of excessive hours of labor for women.

The labor standards for European countries, especially for women and children, were in many respects lower than our own before the war. In the first rush of industry, following the outbreak of the war, these standards abroad were still further lowered. Yet it soon proved that the relaxing of standards failed to achieve its purpose; in England and France and more recently in Italy definite steps were taken by the governments to restore the provisions of the labor law in order to maintain output and conserve the workers. In Italy indeed, the present standards are in some respects higher than before the war.*

Besides the recent reëstablishment of night work in factories, another new form of work at night for women in this country is in the elevator service. Here is an occupation newly open to women throughout the land. They are operating elevators in department stores, hotels and apartment houses, in large and small cities, from California and Utah to Texas and Maine. The work itself does not appear ill-adapted or injurious. The hours of duty, however, are often excessive and cannot fail to be harmful. In New York City for instance, girls are working in apartment houses 15 hours at a stretch; day and night work alternates each week and when the shifts change, the girls are on duty without relief from 6 p. m. to 12 o'clock noon, a continuous stretch of 18 hours. The girls are required to attend to the switchboard telephone as well as to run the elevator. Sunday work is required. One of the most serious abuses of this employment is the exposure of young girls to insult or danger on the all-night shift. In some instances no provision whatever is made for getting rest at night. In other cases an army cot is provided in a hall alcove. In another instance the young elevator attendant sought safety by running the elevator between the first and second landing to obtain sleep between summons.

Nightwork for women has been newly introduced also in the work of automobile cleaning. Women are being employed in New York City garages more than twelve hours each night—from 7 p. m. to 7.30 a. m. They clean from thirty to thirty-five cars during the night.

Another new occupation which exposes girls to moral dangers is the messenger service. In many cities girls are being increasingly employed to replace boys at this work, which should be closely watched. For the dangers involved in sending young boys to questionable houses or resorts has been so great that within the past few years legislation has been enacted in most of

* Child Labor in Warring Countries. Industrial Series No. 4. The Children's Bureau, United States Department of Labor, p. 61.

the states, raising the age limit of boys in the messenger service and prohibiting their employment after stated hours of the evening. It would indeed be a mockery if young girls were now employed at work which has been found unsafe for boys up to 21 years. To safeguard these young workers, legislation is needed so as to include the new occupations in the existing laws limiting hours of labor, etc. Other states might well follow the enlightened action of the State of Washington where the employment of female minors in the messenger service has recently been prohibited by ruling of the Industrial Welfare Commission. In some states, too, efforts are on foot to regulate by law the new employment of girls as bootblacks.

The Need of Equal Wages.

In regard to the general replacement of men by women workers, no single consideration is more important than the matter of wages. This is, moreover, not a social or economic question alone. It is primarily a question of health and must be of the first importance to all those concerned with public health issues. It was General Gorgas himself who put in a few trenchant words the close connection between wages and health. He ascribes to the results of increased wages of the common laborers the world-famous improvement in health at Panama. "I am satisfied," he said to a conference of health officers, "that to this improvement in social conditions, caused by our high wages, we principally owe our extraordinary improvement in general health conditions."*

Another medical opinion on the relation between wages and health has recently been well put in a study of Occupation and Mortality:† "We believe," say Doctors Wynne and Guilfoy, "that wages have a most important bearing upon the morbidity and mortality of any occupation, because, where real wages are high, the standard of living is correspondingly high, housing is better, food is more plentiful and more nourishing; and, in short, conditions are more favorable to physical and mental well-being, which results in greater resistance to disease, more recuperative power, and a healthier enjoyment of life, all of which stimulates the worker to preserve his health and makes him more alert to guard against accidents; whereas when wages are low, home conditions are of necessity unfavorable, and if in addition shop conditions are also bad, as they frequently are, the hazards of any occupation are increased manifold."

The great danger from the standpoint of health is that the employment of women should be resorted to merely in order to obtain cheap labor. As a matter of public health we must see to it that women are paid equal wages for equal work. Otherwise their employment can be and is daily being made the excuse for undercutting the standard wage of men and so reducing the whole standards of living in the community. The reports of the Children's Bureau and the Public

* New York State Department of Health Monthly Bulletin, December, 1915, pp. 369–70.

† Occupation and Mortality. Their Relation as Indicated by the Mortality Returns in the City of New York for 1914. Reprint No. 400, Public Health Reports, June 8, 1917.

Health Service have shown how infant mortality rises *pari passu* with a fall in wage.

It is true that in many of the new occupations women are unskilled and need training. Yet even while they are being trained they should as a matter of health be paid an adequate wage. The standards adopted by the Executives' Club of Detroit to which reference has been made, recommend that while learning, women shall be paid the flat day rate paid to men for the same work or operation.

There are many other pressing health problems in women's new employment needing wise consideration, which cannot even be enumerated here. Instances are beginning to multiply of the lack of decencies and sanitary provisions for women employed in railroad yards and round houses; the housing of women who must leave home is a pressing problem; the matter of clothing is highly important; women obviously cannot do men's work in ill adapted clothes such as skirts which are usually too full or too tight for safety and which are dust gathering in the dangerous trades, or in high-heeled shoes, more quickly inducing fatigue. Separate entrances should be provided for men and women especially in occupations involving heat and grime; the nutrition of the workers, and the provision of restaurants or lunch counters, is a chapter of immense importance.

Summary: Three Essential Safeguards.

In summing up this brief survey of a large topic, emphasis should be laid upon three essential safeguards for girls and women entering upon men's occupations: equal wages, additional legislation and adequate medical supervision. I am aware that in making a plea for this last requisite, I am treading upon very difficult ground. The pressure for physicians for military and civilian needs is so great that a plea for new industrial supervision may appear ill-timed. Yet if any one truth has emerged from three years of warfare it is the indispensable nature of our industrial contribution. To preserve that is a part of the nation's self preservation.

The methods to be used in obtaining adequate medical supervision are of primary importance, and in this connection the National Consumers' League has engaged in a campaign for the establishment of industrial clinics.

Local conditions must determine whether these clinics should be under private, state or federal auspices. But the early diagnosis and treatment of workers suffering from industrial diseases by physicians who know industrial processes and conditions is the only means of more fully learning and controlling these diseases, hitherto little studied. The growing employment of women should be an added incentive to establishing industrial clinics, especially wherever large numbers of workers are engaged in dangerous processes. Where private means or enterprise are lacking and where work on government contracts is being done, it would seem peculiarly fitting for the Public Health Service to establish such clinics and so lead the way in measures of enlightened prevention as well as cure.

CHICAGO'S TUBERCULOSIS PROBLEM.

JOHN DILL ROBERTSON, M. D.,
Commissioner of Health, Chicago, Ill.

Read before the Public Health Administration Section, American Public Health Association, October 18, 1917, at Washington, D. C.

IN 1908 the Chicago Department of Health made tuberculosis a reportable disease. In that year the number of deaths from tuberculosis was 3,915, while only 2,577 cases had been reported to the Department of Health. The number of cases reported increased from year to year in relation to the number of deaths, but it was felt, even with this showing, that the full number of cases was not being reported.

In addition to the maintenance of dispensaries as a method of reaching the tuberculosis patient, and with the idea of getting in touch with children in incipient and easily curable stages, in the spring of 1916 the Municipal Tuberculosis Sanitarium assigned to work in the public schools a force of one hundred doctors and nurses, who worked in conjunction with similar forces from the Department of Health in making physical examinations of pupils. During the school year, September, 1916, to July, 1917, 114,405 examinations were made, and 50,343 pupils were found to have physical defects. Of this number, 4,594 were referred to the Sanitarium dispensaries for further examination, for which examination 2,498 children appeared at dispensary. A diagnosis of tuberculosis was made in 1,407 of these cases, and this number was recommended for open air school treatment.

Having before me, then, such data as were obtainable from the Health Department records of tuberculosis cases reported by the private physician, the deaths recorded, the work carried by the dispensaries, and the results of the examination of school children, I was convinced that a plan different from those already followed must be adopted if we were to have any reliable statistics as to the prevalence of the disease or to make any appreciable dent in its ravages.

Consequently, on August 2, 1916, I introduced a resolution before the board of directors of the Municipal Tuberculosis Sanitarium for the purpose, first, of locating and referring to the dispensary those infected with tuberculosis in the area surveyed; second, to establish their social and financial status; third, to determine the sanitary conditions under which they live; fourth, to collect information in regard to the housing conditions in the area.

The eight square miles of Chicago's most congested districts were selected for this survey. This territory comprised, in the north section, that densely populated Italian district known as "Little Hell," as well as a number of lodging houses, stores, cheap hotels and manufacturing establishments; it embraced the heart of Chicago—the "Loop"—and the south

section took in the best business quarter of the city, which also is occupied by Chinese restaurants and stores, railroad freight depots, warehouses, and many large factories.

Dr. Clarence L. Wheaton and Dr. John Ritter of the Sanitarium staff, well known diagnosticians and clinicians in the field of tuberculosis, superintended the work, Doctor Wheaton in the north section and Doctor Ritter in the south. Under these men, eight physicians experienced in tuberculosis dispensary work were appointed. The actual field work was performed by fifty-five physicians under the personal direction of their supervisors.

All registered cases of tuberculosis in the district were given to the physicians for follow-up, and examination. These cases were known and designated as "old" cases, and comprised 4 per cent of the total tuberculosis cases found in the survey.

Having thus acquainted himself with a number of people in his district, the physician was instructed to begin his house-to-house canvass. He asked permission to examine each member of the family found at home at the time of the call, and, if there were any not at home he returned in the evening to examine them. Educational literature, printed in six languages, was distributed in all homes and places where examinations were made.

The method of procedure in making examinations was as follows: all male patients were stripped for chest examination. In the case of females, the clothing was partially removed and the stethoscope was always placed next the skin. If the findings then warranted further examination of the chest, the clothing was removed and some light article of clothing substituted that permitted of easy exposure of limited areas during the process of the examination. It was not thought necessary or advisable to strip women to the waist.

In making diagnosis, efforts were made to secure sputum specimens, but open tuberculosis was recorded when the findings on physical examination indicated moderately advanced disease, and, in the third stage cases, cavity formation, regardless of whether specimen was obtained or not. In the incipient stage of the disease, the diagnosis of open tuberculosis was not recorded except upon demonstration of the germ. Where sputum could be obtained by the survey physician, patients were requested to take specimen to the nearest dispensary, whence it was sent to the laboratory for examination.

The symptom complex for glandular tuberculosis included, first and foremost, history of tuberculosis in parents or exposure to the disease; enlargement of supraclavicular glands, tracheo-bronchial adenopathy; enlarged tracheal glands; Eustace Smith's sign of bronchial adenopathy; tubular breathing at sides of sternum; harsh breathing posteriorly; bronchial breathing at interscapular space at one side. In a few disputed cases, X-ray and the tuberculin test were employed. Many cases of enlarged cervical glands were eliminated as non-tuberculous where there were findings of pediculi, enlarged tonsils, decayed teeth or other disqualifying symptoms.

Data with reference to duration of disease, possible source of infection, length of residence, nationality and housing conditions were secured; in fact, every effort was made to secure a comprehensive report on each case examined.

The field physician made a written daily report to the supervisor of all work accomplished. In order that there might be uniformity of methods of handling the work, daily and later weekly conferences were called of all field physicians and supervisors.

Each case report was required to bear the signature of the field physician who made the examination and to be countersigned by the field supervisor, before receiving the approval of the general supervisor. Every possible effort was made to secure accurate work and records.

Little difficulty was experienced in obtaining permission to make examinations.

Our physicians were interested and faithful, and did the best work possible. Perhaps 100 per cent efficiency was not attained in this survey—it may be open to some criticism—but it is no less infallible than the work of the medical profession generally.

After careful analysis, I have concluded that approximately 75 per cent of the cases of tuberculosis among those examined have been tabulated. The large number of new and unreported cases found fully justify the expenditure—$42,076.

The population of the eight square miles of the survey district was estimated from the 1916 school census at 371,259. The total number of persons examined was 165,700. Of this number, 14,282, or 8.6 plus per cent, were found to be tuberculous. The medical classification of these cases is as follows:

		Per cent
Pulmonary	5,876	41.1
Glandular	7,269	50.8
Pulmonary and glandular	815	5.7
All other forms	322	2.2

You will note the large number of glandular cases recorded, many of them among children.

An analysis of 6,610 cases classified as first, second or third stage cases shows that 4,407, or 61 plus per cent, were incipient; 2,240, or 33 plus per cent, moderately advanced, and 323, or 4.8 per cent, were far advanced.

The method of differentiation between "open" and "closed" cases has already been described. Due to the fact that it was possible to secure sputa in only a small percentage of the cases, and the further fact that a case may be an open one this week and a closed case next week, I do not feel that the 1,030 cases tabulated as open cases represent the true percentage of the total of 11,361 cases considered.

Neither the colored belt nor the Chinese district were included in the survey, therefore only 156 colored and 30 of other races are among the 14,282 cases found, making 14,096 contributed by the white race.

The following table shows the birthplace of the 14,282 cases:

Chicago	7,216
U. S., elsewhere	1,965
Italy	1,590
Poland	816
Russia	693
Austria	368
Germany	345
Scandinavia	238
Ireland	210

Great Britain	185
Hungary	174
Bohemia	102
Lithuania	12
Other Slavic	52
Other Germanic	29
Other Latin	183
Other foreign	95

The length of residence in Chicago of 14,025 is as follows:

Since birth	7,180
Less than 1 year	397
1 to 5 years	1,718
5 to 10 years	1,792
10 to 20 years	1,890
Over 20 years	1,048

There were 734 more females than males. This is accounted for by the fact that in a house-to-house survey, such as this was, more women than men were examined.

Records of the ages of those found tuberculous were compiled from statements of the parents or some member of the family; it is obvious that data could not be verified from birth records. Of the number found to be tuberculous 932 were under 3 years of age; 6,432 between 3 and 14; 1,165 were between 14 and 21 years of age, while the adult years of life, or what might properly be called the productive period, from 21 to 40 years, showed 3,747 cases. The period from 40 to 60 showed 1,675, and over 60, 300 cases.

The large number of children examined accounts for the fact that 9,787 persons were classified as unmarried; 3,888 were married, 526 widowed and 81 were divorced.

Statistics as to religious belief show 71.7 per cent Catholic; 18.1 per cent Protestant; 8.2 per cent Hebrew, the balance being without history.

Catholic	10,250
Protestant	2,588
Hebrew	1,181
Without history	263

Great difficulty was experienced in securing data as to occupation, the Italian being particularly loath to give the nature of his employment. Information obtained in 6,069 cases showed 443 persons engaged in some manner in the handling, packing or preparation of food products, 282 were cooks or waitresses, 305 were engaged in the manufacture of clothing, 34 were barbers, 26 cigarmakers; other indoor occupations contributed 4,108, and outdoor occupations 871. Occupation is unaccounted for in 8,213 instances, which number includes 7,395 children under 14 years of age, nearly all of whom are without occupation. This brings the actual number unaccounted for down to 818. The housewife was tabulated as employed, her working conditions being the sanitary condition of the home. Her hours of employment and wages were, of course, not obtainable.

The hours of employment were tabulated in 2,740 cases, and it was found that of this number 24 were employed from 1 to 4 hours; 21 from 4 to 6 hours; 97 from 6 to 8 hours; 1,508 from 8 to 10 hours; 967 from 10 to 12 hours, and 83 over 12 hours, the hours of the housewife, of course, not being considered.

In 2,689 cases investigated it was found that the wages per day averaged about as follows: 17 received 50 cents per day or under; 159 received between 50 cents and $1; 559 received between $1 and $1.50; 539 between $1.50 and $2.00; 578 between $2 and $2.50; 808 between $2.50 and $5.00, and 19 over $5.00 per day.

The working conditions in 1,591 cases

out of 5,710 instances investigated were considered good; 3,177 cases were found to be medium, and 942 cases bad.

The kind of dwelling place was noted in 13,607 instances, and it was found that 2,671 were domiciled in separate houses and 10,936 in tenements. The Chicago ordinance makes no distinction between a tenement house (which may be roughly stated to be a building in which two or more families live, keeping house separately) and an apartment house, but in an effort to differentiate between these two classes, which are recognized in some cities, the number given may be divided approximately as 3,463 in apartments and 7,473 in tenements. I may say that the classification in the latter instance was made as to condition of building, crowding, rate of rent, a tenement being a low grade apartment house.

Housing Conditions

Kind of dwelling	
House	2,671
Apartment	3,463
Tenement	7,473
Hotel	132
Jail	202
Front	7,515
Rear	5,063
Floor	
Basement	715
First	4,325
Second	5,678
Third	2,072
Fourth	401
Attic	78
Total	13,269
Number of rooms in the home	
One	661
Two	656
Three	1,872
Four	5,901
Five	1,942
Over Five	2,665
	13,697
Number of occupants in the home	
One	503
Two	713
Three	1,230
Four	2,250
Five	2,409
Six or over	6,690
Total	13,795
Rent per month	
Under $5.00	237
$5.00 to $8.00	2,099
$8.00 to $12.00	5,585
$12.00 to $15.00	2,212
$15.00 to $18.00	1,231
$18.00 to $22.00	756
$22.00 to $25.00	237
Over $25.00	409
Owner	751
No rent	90
Jail	202
Hotel	107
Total	13,916

Classification as to sanitary conditions was as follows:

	Good	Bad	Total
Plumbing	10,109	3,800	13,909
Ventilation	9,232	4,705	13,937
Cleanliness	8,202	4,711	12,913
Garbage disposal	11,479	2,125	13,604

What does our survey show with reference to tuberculosis in these blocks? In the block bounded by Milton, Townsend, Chicago and Locust Streets, we found 90 cases of pulmonary and 133 cases of glandular tuberculosis. In the block bounded by Milton, Cambridge, Division and Elm Streets we found 68 cases of pulmonary and 123 cases of glandular tuberculosis. In the block bounded by Milton, Cambridge, Hobbie and Oak Streets, we found 20 cases of pulmonary and 26 cases of glandular tuberculosis.

The examination of the employes of some of the large business houses yielded interesting and sometimes startling information. In one candy factory where over 1,000 people were

employes, examination was made of 698. Of this number 100, or 14 per cent, were found to be tuberculous—this in a candy factory which distributes its product over almost the entire civilized world. The same general conditions were found to prevail in all the candy and confectionery factories included in the survey.

We examined 1,514 employes of the United States Government in the Chicago Post Office, and found 70, or 4.6 per cent, suffering with tuberculosis. We have learned that many of the employes evaded examination for fear of losing their positions if pronounced tuberculous.

The Chicago Telephone Company's employes showed 49 cases in 520 examined, or 9.4 per cent.

The employes of every restaurant and hotel, and this includes the very best hotels in our city, showed from 8 to 20 per cent suffering with easily detected tuberculosis.

The Cook County Jail was included in our survey. The jail building is an old one, poorly ventilated, and with no sunlight penetrating to 99 per cent of the cells, which are cement cubicles, with iron grating doors.

Out of 427 regular inmates and 317 transients examined, 102 of the regular inmates were diagnosed tuberculous, and 100 cases of tuberculosis were found among the transients. All told, 27.1 per cent of the population of the jail at the time the survey was made were found to be tuberculous.

In a study of the Michigan tuberculosis survey for the twelve months from October 1, 1915, to October 1, 1916, I note that it included an examination of 11,528 people, 2,914 of whom were diagnosed as positive tuberculosis, 2,231 as "suspicious cases" and 404 as arrested cases. In other words, of the number examined, 44.6 per cent were found either tuberculous, suspicious or arrested. But in comparing these findings with those of the Chicago survey it must be borne in mind that the Michigan survey was not a house-to-house survey, but largely a clinic, or travelling dispensary, which examined only those persons who felt sick and had some reason for going to the survey clinic, while the Chicago survey was made from house to house, in a territory where three dispensaries had been located for a period of approximately ten years.

This survey has shown us where to locate our dispensaries so as to be in close proximity to the known cases, and has shown the utter futility of the old dispensary clinics standing alone, and the necessity for reorganizing the field service on an all-time medical basis instead of a part-time basis as heretofore. It has caused the board to halt in a contemplated plan of expending $600,000 for an additional hospital, and to rest upon our oars and consider whether it is wise to provide extra beds on the Sanitarium grounds for 1 per cent of our tuberculosis patients and leave little or nothing for the care of the 99 per cent left in the field.

The tuberculosis load is much more than heavy enough for our present budget, and when we consider the experience of France and England in the present war I feel that we should be ready for any emergency which may arise and have money in our exchequer

to care for the extra burden which is sure to be imposed because of our participation in the war.

The conclusions which may be drawn from our survey are many, and those arrived at depend, I feel, upon the viewpoint of the individual who makes the appraisal. If I were to ask the housing expert to solve the tuberculosis problem, he would doubtless say, "The house should carry the greater part of the blame." The union labor man would tell you, "The unfairness of capital is the cause." The employer would say, "Shiftlessness." The charity worker would say, "Poverty is the cause of it all."

In looking at the housing situation I think a distinction should be made between the house, as such, and the condition in which a good house may be put to an improper use. What has the house and the vacant air spaces in the district surveyed to do with the tuberculosis found therein? The figures show that in a number of instances too many people sleep in one room; that the windows are frequently kept closed, and that the rooms are dark in numerous instances on account of narrow areaways. In a large number of instances the house was all right in all the above respects, but the house *per se* was not to blame if six or eight people slept in one room, with the windows shut and the curtains tightly drawn.

Referring to previously noted figures, it will be seen that 51.5 per cent of the cases discovered were among children under fourteen years of age. The large number of Italian children found infected, and the fact that Italians live largely upon a carbohydrate diet, and the small number of Jewish children discovered, although the survey included the Chicago Ghetto, compels me to conclude that the character of the food consumed is one important factor.

On the other hand, we must not forget that these Italians come from the warm climate of Italy, whereas a large number of the Jewish children and their forebears come from Russia, a cold climate, and just as the negro coming from the southern United States to the north becomes an easy prey to tuberculosis, just so does the Italian from sunny Italy.

A study of the amount paid for rent and the low wages received would convince many that lack of money was the root of the trouble.

It was noted that a history of measles or other contagious disease was present in a very large percentage of the children. Therefore many people will conclude that contagious diseases had prepared the soil for the infection of tuberculosis, and that infections were spread by close contact due to overcrowding. As I see it, the greater part of the tuberculosis in the district surveyed was caused by repeated infections due to close contact. This close contact was brought about largely by overcrowding in the rooms of the tenements, and by overpopulation in the district as well.

We cannot get away from the consumptive. Several millions of them are now living in the United States. The tubercle bacillus is everywhere, and we must conclude that the community free from almost universal infection is rare. Cobbett in his "Causes

of Tuberculosis," just off the press, intimates that perhaps it is well that all of us should become infected with tuberculosis in small, immunizing doses, as we are now being infected. Perhaps if we were to carry our propaganda too far—clean up too much, so that there is not frequent opportunity for us to get our immunizing dose—we would soon have a race as susceptible to tuberculosis as was the American Indian in his primeval forest. Therefore it is probably desirable that we should become immunized and gain a certain measure of protection from a small dose of tubercle bacilli well resisted. These early, latent infections no doubt bestow an immunity against the effects of larger doses which one may later unfortunately experience. Too much comfort must not be derived from this, however, for in young children any degree of infection may become generalized and rapidly fatal. It is obvious that to measure scientifically our dosages against individual resisting powers is the problem to be solved by the laboratory worker and the clinician. To neglect our sanitary precautions, all our known methods of fighting the spread of tuberculosis, on the theory that its prevalence means protection, would be folly.

I plead for a control of tuberculosis through the vaccination methods used in smallpox, diphtheria and typhoid fever; a vaccination which can be measured and administered scientifically, with nothing left to chance in the size of the dosage.

But, while we may differ as to the most important contributing factor in the spread of tuberculosis, we must all agree that there is no question regarding the necessity of caring for discovered cases.

In my dual rôle as commissioner of health and member of the board of directors of the Sanitarium I have had access to much information which would not have been easily obtained had I occupied only one of these positions. In attempting to outline a plan for controlling tuberculosis, therefore, I had in mind the experience which Chicago had in 1894, when it had a terrific epidemic of smallpox, and I studied the measures adopted at that time. I had in mind the fact that tuberculosis is contagious by contact, much as measles, scarlet fever and diphtheria are. I had in mind the powers possessed by the Department of Health to regulate diphtheria, scarlet fever and other contagious diseases, as outlined in the Chicago ordinances. An opinion from the Corporation Counsel of the City of Chicago, rendered May 19, 1917, stated that the Commissioner of Health of Chicago is charged with the control of contagious diseases by such methods as may to him seem proper, and that his powers may be exercised in the control of tuberculosis as well as in cases of scarlet fever, smallpox or diphtheria.

But what are the proper methods of preventing this disease and caring for cases after they develop? What steps will be productive of most good?

We have tried education. We have had our tuberculosis exhibits, our city, state and national societies for the study and dissemination of information regarding this disease. We have no doubt that much has been accom-

plished by these means; but do we depend entirely upon an educational campaign for the control of scarlet fever or diphtheria? Certainly not. We find it necessary to provide hospital facilities for these diseases. We find it necessary to establish quarantine where cases remain in the home, and to lay down certain more or less stringent rules regarding the conditions to be maintained in the home.

In the control of tuberculosis, education has not sufficed, nor has the care of patients in well built and wonderfully equipped sanatoria served to make any appreciable dent in the figures showing the morbidity and mortality of tuberculosis.

But we cannot, with our newly awakened social consciousness, say to these unfortunate people, "We have told you you must do thus and so, or suffer the consequences. You have not listened to our gospel of fresh air and sunshine, good food and proper shelter, therefore you must have tuberculosis." Rather we feel that we must put forth greater effort, and, if the mountain will not come to Mahomet, then Mahomet must go to the mountain, and so I have come to the conclusion that we must go into these homes, and, by a judicious use of education and a "big stick" seek to mend the situation.

I have in mind a plan, practically the Heiser plan, which I feel might be productive of results if faithfully and consistently carried out; something along this line:

When a case of tuberculosis comes to the attention of the health authorities, a physician or a nurse should be sent to visit the patient. The patient will be advised as to the danger to his family and friends if he continues to expectorate upon the floor; of the danger to himself if he continually refuses to sleep outdoors; of the danger of over-indulgence in alcoholic drinks in his condition, and any other instruction which may be necessary in the particular case. Sputum cups will be supplied where the patient is unable to furnish them, or any other necessities of this kind which are required.

If, upon subsequent visits the nurse finds that the patient has his paper cup in his pocket, and is using it; that there are no signs of expectoration elsewhere; that at least the head of his bed is outdoors; that he apparently is following the instructions laid down not only for the protection of himself and his family, but the people with whom he mingles in his daily life, then he is permitted to remain at home and every possible aid is given him to further his recovery there.

But if, on the other hand, the nurse or quarantine officer finds that hygienic rules are not being observed, the patient is warned that further infractions will result in his being put in an ambulance and transported to the Municipal Tuberculosis Sanitarium. As I have said above, under the powers possessed by the commissioner of health we have the same right to do this that we have to hospitalize a case of smallpox.

The patient when taken to the Sanitarium is put into a cottage with other patients who are there likewise for training and education.

I believe that if every individual suffering with what is known as open

consumption were apprehended and, if necessary, by force compelled to conduct himself in the sanitary manner which we compel the patients at the Sanitarium to adopt, the spread of tuberculosis would be greatly reduced.

Every consumptive who is trained to follow the rules of hygiene in caring for himself and in protecting his family and associates against his disease is one of the strongest educational elements we can place in a community.

So, when a patient at the Sanitarium has become thoroughly familiar from daily drilling, instruction and observation, with the proper way of conducting himself, he should be permitted to return to his home if he so desires.

A certain number of beds in the institution should be reserved for just the purpose of training patients to make them safe for the community.

If there are, as has been estimated, between 60,000 and 70,000 cases of tuberculosis in the city of Chicago needing sanitarium supervision and control, and but *750* patients can be accommodated at the institution under our old system, this means that but 1 per cent of the cases could be hospitalized, 99 per cent remaining in the field to disseminate infection to others. But if, under the plan proposed, a certain number of beds be reserved for "educational" purposes, and these filled by patients whose length of stay varies from one week to a month or more, a very large number of patients can be accommodated during the course of the year.

The adoption of such a plan as this would necessitate changes in the present rules of the Sanitarium, and would mean the expenditure of much larger sums of money for field work, the supplying of necessities for home care of the patient where the family is unable to furnish them, and would lead to an immense broadening of the "out-patient" department of the Sanitarium.

But it would also mean that the influence of the Sanitarium methods would be more widely distributed, among a steadily increasing number of people. I believe that it would *pay* —immediately and ultimately,—as the most effective measure which might be adopted. It would mean a more careful patient, a more careful family; it would mean that any other case which might develop in the family would be given earlier medical attention; it would mean a gradual lessening of infection; it would mean, I believe, a gradual elimination of the spread of tuberculosis.

I have little sympathy with those who counsel that we must go slowly, that the public is not yet ready for radical measures in stamping out tuberculosis, that we must educate some more, that the private physician's patient must not be brought under the control of the health authorities, that neither the doctor nor the public is ready for such a step. I ask, when will they ever be more ready? After years of preparation it seems to me that we have reached the psychological time for this "clean-up." Ten million young men are just having an audit made of their physical machinery. Specialists in every line are at work on 10 per cent of our population. The government is discarding the

tuberculous as unfit, and every registration area in the United States has its quota of this class. In Chicago we are getting them and looking after them. Every other district in the United States should do the same.

What would you think of a farmer who, having a field dotted with Canada thistles, would go over it, rooting out every third, or fifth, or tenth plant, leaving the balance to reseed the field? Would we not know that his field would still be infected? Why is not the same fact true of tuberculosis? We have seen the weeding out of the tenth, twenty-fifth, or seventy-fifth case, leaving the remainder to continue to spread infection faster than it can be detected and controlled. Why is not this the time to discover, supervise, direct—by force, if necessary—the tuberculous in our midst? Let us have done with the twaddle that the community should not act against a tuberculous patient the same as it does against one with any other contagious disease! Let us tackle the entire problem; let us weed the entire field!

We have spent much time and money "educating the profession." Well, if this is a hopeless task and does not secure the desired results, why not expend our time, money and energy along a different line? Let us act with decision, do what is right, and the doctor will be educated in this manner more quickly than in any other.

I feel that the value of the requirement of a health certificate by all employers of labor is forcibly demonstrated by our survey. Should this become a general custom it ought to be of material assistance to the health authorities in their efforts to control the situation with reference to tuberculosis. The establishment of welfare departments in connection with every large business would then follow as a matter of course. Chicago has taken a step in the right direction for two years past in requiring children to present health certificates before entering school.

The great need of regular medical examination of *all* persons is too evident to require comment.

◆

PRACTICAL STANDARDS FOR FACTORY SANITATION.

GEORGE M. PRICE, M. D.,
New York City, Chairman of Committee on Shop and Industrial Sanitation, National Council of Defense.

Read before the Industrial Hygiene Section, American Public Health Association, October 17, 1917, at Washington, D. C.

THROUGH the courtesy of Dr. Evans, chairman of the Committee on Sanitation of the Council of National Defense, I was appointed as chairman of a Committee on Shop Industrial Sanitation. The function of the committee was to establish and adopt sanitary standards for factories and shops working on Government contracts.

To assist me in the formation of these standards, the following were invited to become members of the committee: Dr. John Vogt, representing the New York State Industrial Commission; Dr. Francis D. Patterson, representing the Department of Labor and Industry of Pennsylvania; Mr. John Roach, representing the Department of Labor of New Jersey; Mr. William E. Duncan, deputy commissioner of the Department of Labor and Factory Inspection of Connecticut; Dr. L. Harris, representing the Health Department of New York City; Dr. Thomas Darlington of the American Iron Institute; Dr. Walter G. Hudson of the du Pont de Nemours Company; Miss Pauline Goldmark of the National Consumers' League; Mr. William Groeniger of the Ohio State Board of Health, and Mr. Young of the American Museum of Safety.

The principles by which the committee has been guided in its work were the establishment of sanitary standards for government work in factories and workshops, that would be just to the employers as well as to the workers, that would safeguard the lives and health of the workers, without creating too great a burden upon the employers. The standards were to be neither the maximum of the possible ideal sanitary workshop nor the minimum local requirements demanded by some states and labor departments. The standards were also to fit large as well as small industrial establishments and be applicable to city as well as suburban factories and workshops.

The personnel of the committee was such as to insure efficient and just standards, at the same time conforming to the differences in legislation of the most important eastern states, where a large part of the government work is being done.

The committee, at the outset, has limited its work only to ordinary factories and workshops, that is, such establishments where there are no special industrial health hazards, where there is no appreciable amount of dust, nor any appreciable gases, fumes or poisons. These special industrial establishments were to be dealt with by a special committee.

The standards adopted were under the heads of (1) Drinking Water; (2) Washing Facilities; (3) Toilet Facili-

ties; (4) Dressing-rooms and General Cleanliness.

Drinking Water.—The standards *in re* drinking water included not only general provisions, but also details as to location, drinking fountains, receptacles and drinking cups. The committee felt and accepted as a standard that no common drinking cups or glasses should be permitted.

Washing Facilities.—Aside from the general provisions, standards have been adopted as to location, number, floors, towels, and receptacles for soiled towels.

As to number, the standard has been adopted that there should be provided at least one sink or stationary basin with hot and cold water for every ten employees, or at least two feet of trough sink for every ten employees, or a perforated pipe with a continuous flow.

Toilet Facilities.—The standards as to toilet facilities naturally created much discussion, in view of the differences in the legislation of the various states and municipalities. The standards finally adopted contain, besides the general provisions, articles about the apartments, location, separation, screening, distance, construction, floors, walls, ceilings, light, ventilation, heating and cleanliness. Also provisions about fixtures,—kind, connections, number and ratio; also urinals,—kinds, construction, connections, number and ratio.

An interesting standard was the one relating to toilet rooms not having sewer connections and maintained outside of buildings. These were to be at least twenty-five feet distant from the building and in all factories where the workers are exposed to excessive heat, humidity, or fatigue from physical exertion, there was to be provided a covered passageway connecting said building with the toilet or toilets.

Another interesting provision was the prohibition of any form of trough water-closet, or latrine or school sink.

As to the ratio of the number of water-closets to the number of employees, the standard adopted was one closet to twenty, and where there were more than one hundred employees, the ratio was changed to six to one hundred and fifty, and one additional water-closet for each thirty additional persons.

As to urinals, the provision was that there should be one urinal for ten to thirty male employees, two for thirty to sixty, and one for each additional fifty men employed.

In reference to dressing facilities, the committee felt that it was unwise to demand separate dressing-rooms in ordinary factories where no poisonous materials, dusts or fumes are handled, and which are free from excessive heat, humidity, etc. The provision simply reads that each worker should be provided with a clean place in which to change from street clothes to working clothes. A pipe rail equipped with clothes hangers and fastened high enough from the floor to prevent the clothes from dragging is to be accepted in lieu of dressing-rooms.

With an additional general provision as to general cleanliness and receptacles for rubbish, the sanitary standards were completed.

The committee, of course, realize that the establishment of standards is but a comparatively small part in the sanitation of governmental industrial establishments. We realize that the protection given to workers in industry is not determined by the number and character of the laws or standards established and adopted, but rather by the character of their enforcement, by the efficiency of the administrative machinery and by the proper and efficient inspection and enforcement.

Fortunately, in the special Bureau of Standards, appointed by the Secretary of War for the administration of labor laws in factories doing work for the nation, an efficient and highly qualified administrative body has been created, which may be fully trusted to enforce the standards adopted by our and other committees.

REPORT OF COMMITTEE ON NON-RESIDENT DEATHS.

WILMER R. BATT, M. D., *Chairman*,
Harrisburg, Pa.

Read and approved before the Annual Meeting of the American Public Health Association, Section on Vital Statistics, Washington, D. C., October 19, 1917.

A CONSISTENT and satisfactory method for the statistical treatment of deaths of non-residents continues to be in the experimental stage. The Division of Vital Statistics of the Bureau of the Census has made several attempts to solve this problem, none of which has been entirely satisfactory. First, because of the difficulty experienced in defining a non-resident and, second, the failure on the part of the undertakers and registration officials to appreciate the importance of full and complete replies to Item 18 on the present standard certificate of death.

In the mortality report for 1914 the Census Office presented a table showing the number of deaths exclusive of still-births and the death-rate including and excluding deaths of non-residents for the several portions of the registration district, based upon the following definition of a non-resident: "A person who dies in a hospital or other institution and whose previous residence is given on the death certificate as other than in the registration district in which the death occurred." It will be noted that the non-resident class under this definition was limited to certain deaths in hospitals or other institutions without regard to the length of residence in the registration district in which death occurred.

For the mortality statistics of 1915 the Census Office attempted to present a statistical table concerning the deaths of non-residents, according to the following definition: "A person who dies in a hospital or institution whose previous residence is given but who lived less than one year in the registration unit in which the death is compiled." The failure to supply the information as to the length of residence in the registration district in which the death occurred was in the aggregate so large that no statistical table was presented for the year 1915

in relation to non-residents according to the above definition.

For the mortality statistics of 1918 it is proposed by the Census Office to present a statistical table based upon the following definition of a non-resident: "A person whose usual place of abode is outside of the registration district in which he dies." And it is further proposed to present the material in the following form:

(1) Total deaths including non-residents.

(2) Deaths excluding transferable non-residents.

(3) Deaths excluding transferable non-residents and including residents who die in registration area outside.

(4) Non-resident deaths not transferable.

As this would seem to constitute the first systematic effort to reassign deaths to the locality of abode wherever possible and to make possible a comparison between transferable and non-transferable non-resident deaths, it would certainly afford an opportunity for estimating to what extent our mortality statistics are at the present time capable of refinement in reference to the deaths of non-residents. Your committee would therefore endorse the effort of the Census Office as affording a basis for more definite action in the future.

REPORT ON REGISTRATION AFFAIRS.

Wm. H. Davis, M. D.,
Chief Statistician for Vital Statistics Census Bureau, Washington, D. C.

Committee Report read before the American Public Health Association, Section on Vital Statistics, Washington, D. C., October 19, 1917.

THE death registration area now includes 26 states, the District of Columbia and 47 cities in non-registration states, and relates to 70.2 per cent of the population of the United States.

The only additions to this area in 1917 have been the following cities in non-registration states: Brunswick, Ga., Alexandria, Baton Rouge, Lake Charles, Monroe, and Shreveport, La.; and Houston and Cleburne, Tex.

Tennessee is now being tested and is expected to measure up to the required standard. Illinois will doubtless be ready soon for admission.

A new registration law, based upon the Model Law, was enacted this year in Oklahoma so that this state should soon be eligible. Texas has also improved its law and the outlook is for a gradual extension of the death registration area, but satisfactory registration of deaths in every state can hardly be expected inside of another ten years.

Early in 1917 physicians in the registration area were requested to send to the Bureau of the Census the names of their patients who died in December, 1916. In this way it has been possible to check the completeness of death registration in any state suspected of incomplete registration. Complete figures are not yet available, but enough has been done to demonstrate the value of the test.

Special agents of the Bureau of the Census have been appointed this year in North

Carolina, Mississippi, Kentucky, Ohio, Louisiana, and Virginia. These agents receive a nominal salary and are authorized to query incomplete returns for the Bureau of the Census. This plan will undoubtedly be extended gradually to other states, and should be of distinct benefit to the Bureau of the Census in that the incomplete returns will be queried monthly when they are received at the state offices, while queries from the Census Bureau cannot be made till the transcripts have been received, which may be months after the deaths occur. This shortening of the time between the time of death and the query sent out for completion of the death certificate should result in more accurate information for the final records. The state records should likewise be improved by the plan, for all additional information will come directly to the state office and the final record in the state office will always agree with the final records at the Bureau of the Census.

Birth Registration.

The birth registration area, which was established in 1915 and then included the six New England States, New York, Pennsylvania, Michigan, Minnesota, and the District of Columbia, representing 31 per cent of the population of the United States, was enlarged for 1916 by the admission of Maryland, and for 1917 by the admission of Virginia, Kentucky, and Indiana. In fact, the 1917 area will also probably include North Carolina, Ohio, Wisconsin, and Utah, and cover a territory in which dwell 50 per cent of our population.

The tests which are being made by the special agents of the Census Bureau are beyond question improving both birth and death registration very much. Immediately following the recent test in Kentucky, Dr. A. T. McCormack, Secretary of the State Board of Health, while commenting upon the great benefit of the test to registration in Kentucky, jokingly remarked that he had only one fault to find with the test, namely, that it had so stimulated death registration that the Kentucky death-rate had gone up two points.

Tests have been made this year of birth registration in the New England States by checking the deaths under one year in 1916 where the decedents were born in that year in the state against the birth transcripts on file in the Bureau of the Census. Lists of the deaths for which no birth transcripts were found have been sent to the state registrars with requests that they check up these names in their files.

The figures of the test in the Census Bureau indicate a deficiency ranging in these six states from 11 per cent in Vermont to 22 per cent in Rhode Island. But there is reason to believe that these figures will be reduced more than one-half when the state registrars make their final reports, for many births thought at first to be missing will probably be found under different spellings.

The outlook for better birth registration was never so bright as it is today. The present emergency has awakened the people as never before to the importance of this question. Indeed, the outlook is excellent for a registr tion area for births which within two years will include two-thirds of the population of the United States.

But even this hopeful outlook is not satisfying if a still better one is possible. Would it not be glorious if Congress would enact legislation which would make compulsory the registration of every birth. As one prominent registrar expressed it such legislation would advance the cause of birth registration "twenty years."

HOSPITAL STATISTICS AS AN AID TO PUBLIC HEALTH ADMINISTRATION—THE PHILADELPHIA PLAN.

CHAS. SCOTT MILLER, M.D.,
Chief, Division of Vital Statistics, Bureau of Health, Philadelphia, Pa.

Read before the Section of Vital Statistics, American Public Health Association, Washington, D. C., October 18, 1917.

THE statistical method has been established as the basis of all epidemiological studies. While success rests on the interpretation of the collected data, primarily the success or failure of any study depends on the accuracy of the data. Time was when *mortality* indicated to the public the relative health of the community; time is when we regard *morbidity* as the rule by which we measure health standards. Death may indicate the failure of medical science, but sickness as certainly indicates in many instances the failure of the individual or a community to observe the proper sanitary laws.

With these thoughts in mind the Division of Vital Statistics began an investigation and review of hospital reports in Philadelphia. We aimed:

1. To obtain some concise idea as to the manner of making the reports covering both morbidity and mortality;

2. To obtain the effect of hospital administration on the fatality rate of certain diseases;

3. To aid public health administration by a definite knowledge of the incidence and location of non-reportable diseases.

A study of the annual reports from sixty-five hospitals showed the amazing fact that no two institutions employed the same nomenclature. Even the published reports of a single hospital presented a varied classification for the different departments. Hospital statistics as they exist today are of no practical value in determining the efficiency of the hospital treatment. In a like manner, the complete experience of a given institution for a specific group of diseases cannot be determined. The standardization of nomenclature and the proper presentation of data covering morbidity, as well as mortality, should be the next step in "preventive medicine." While most institutions give a complete and detailed report of donations and contributions, there are but few that offer data covering the more important facts, namely, the medical administration and statistics of sickness and death. Year by year thousands of cases are being carefully studied in the various centers of medical education. Such studies should be of service in compiling our experience covering the non-reportable disease group. However, each year sees these data either neglected altogether or compiled in a haphazard way, without following any standard method. Transmissible diseases are now being reported with at least a fair degree of regularity, but as public health officials we should urge measures aimed toward the collection of accurate data including the non-

reportable group of diseases. Cardio-renal-vascular diseases, cancer, diseases of the thyroid, etc., undoubtedly, are of as much interest to the practitioner of medicine as are the epidemic diseases and the efficacy of various forms of treatment is of far greater importance to the individual than the detailed list of the hospital donations.

As an instance, the recent outbreak of influenza might be cited. During one month there were as many persons succumbed to this disease in Philadelphia as died from it during the whole of the previous year. While vital statistics showed the disease to be widespread in character, it became a question of local interest whether one particular part of the city was affected more than another; and if occupation, housing or racial influence had any bearing on the incidence of the disease, as well as the case fatality. No one was able to answer these queries. As a result, preventive and educational work could not be concentrated and data of a general character was distributed to all classes in all sections of the city. The same condition confronts the sanitarian and epidemiologist in the majority of the minor infections and non-reportable diseases.

In Philadelphia at the present time there are ninety public and private homes, not one of which includes in its annual report a statistical table covering their morbidity or mortality. Of course, it is reasonable to suppose that the mortality in these institutions is almost nil. On the other hand, certain foundlings homes would be supposed to have a high mortality rate. There are approximately eighty hospitals located in the city. A study of the latest reports from forty of the largest of these institutions showed that thirty-two or 80 per cent make some statement of morbidity and mortality, while one gives neither morbidity or mortality. Five state mortality only, while two give morbidity only with a general statement covering mortality. Twenty-three hospitals employ detailed classification of their morbidity and mortality, but no two are comparable. In many cases reports of the various departments use different nomenclature. The reports of three institutions are worthy of note. One, a psychopathic hospital, one hundred years old, gives annually a summary of all patients admitted during the past. Its statistics cover in some detail the alleged cause of disorder, age on admission, sex, occupation, civil state, duration of disorder, residence and the final results of treatment. A second hospital classifies all house patients as discharged or died in the terms of the International Classification. Out-patients are grouped variously according to the report of each service. No detailed analysis is attempted. The third institution—after a general summary of the social status, nativity and occupation of all house patients, and a further summary of diseases or injuries, number of dispensary visits and number of operations performed—proceeds to give a detailed list following the Bellevue Classification, with the corresponding title number of the International List. The classification is divided into In- and Out-Patients with the former subdivided according to staff service or

non-staff. The final termination of the case is given (discharged, died or remaining) and the total number treated. This is by far the most comprehensive report issued in the city of Philadelphia.

The second factor our study endeavored to determine, *i. e.*, the effect of hospital administration and treatment in certain diseases, proved of no avail. Treatment was not divided or classed in any way to permit of intensive study.

The third point or a possible aid to public health administration by the incidence and location of non-reportable diseases was found unavailable because of the grouping of the diseases without regard for the chronology of their development, as well as because of a lack of the data concerning the patients' usual residence.

Therefore, it was demonstrated that hospital statistics fulfilled no function in the majority of instances and that disease records in such a center of medical learning as Philadelphia were arranged in a manner to make them of no assistance to the practicing physician, to the sanitarian or to public health officials.

Dr. Charles F. Bolduan, a few years ago, suggested a system of reporting morbidity statistics of hospitals.* His suggestion was that the whole system be based on a "discharge certificate" report which should be similar to the death certificate. These certificates should be supplied to hospitals and one returned by the institution to the central bureau, for each patient discharged. Then, by means of mechanical tabulation, each certificate should be transferred to a tabulation card and statistics compiled, in very much the same way as the form now employed all over the United States for the collection of vital statistics. The system herewith presented is by no means so elaborate. Frequent attempts in the past have been made to obtain detailed reporting from hospitals, but they have given no results. Our present system was readily accepted because of its simplicity and while fully realizing the inadequacy of our information for detail analysis, I believe it is all that can be hoped for as a beginning. If we obtain the coöperation of the majority of our hospitals to this form of reporting, we shall be able to train them into more detailed and intricate returns as time progresses.

Mr. Frederick L. Hoffman's treatise on "The Statistical Experience Data of the Johns Hopkins Hospital, 1892 to 1911" is of great value in formulating hospital data. While, as he suggests, the Bellevue Classification is better for medical purposes, the general method of statistical presentation, as used in the Hopkins Report, is practical and would make the enormous amount of hospital data useful to many branches of science.

In the early part of February we communicated with the Secretary of the American Hospital Superintendents' Association, asking that he introduce a resolution at their next meeting of the Local Branch, endorsing our system of collecting morbidity statistics from the various hospitals

* Hospital Morbidity Statistics, Charles F. Bolduan, New York Medical Journal, March 29, 1913.

in this city. This organization represents sixty-five of our largest institutions. In accordance with the idea, on February 12, the American Hospital Superintendents' Association endorsed the "Philadelphia Plan" and urged that all hospitals begin to report monthly morbidity as suggested by the Division of Vital Statistics.

This form follows the classification of the Abridged International List of the Causes of Death, with the insertion of the two venereal diseases and coroner's cases. The general subdivision of sex is noted with the number of cases and number of deaths by total and sex. While we realize that this is not ideal, we consider it is the beginning of a system of morbidity reports which will develop as time goes on and eventually give rise to a more complete and detailed classification.

Briefly, the plan is as follows:

The latter part of February a form letter, an instruction sheet and a vest pocket edition of the International List of the Causes of Death were sent to each hospital superintendent. The form letter contained the resolution passed on February 12 by the Local Branch of the American Association of Hospital Superintendents.

"That this body is desirous of aiding the Bureau of Vital Statistics in the correlation of the information requested on two blanks presented, and will aid the bureau to obtain such information if the hospitals are supplied with the necessary blanks."

Secondly, the letter emphasized the method of classifying deaths when there existed two or more conditions in the deceased. This followed the rules adopted by the American Public Health Association in 1909.

Thirdly, attention was called to Item 41, which, if deducted, would give a net hospital mortality.

The idea was to obtain January 1 a list of all cases remaining in the hospital, classified according to the Abridged List by sex. This applies only to the beginning of the period studied, as the residual cases for December would be already counted in the morbidity of that month and if repeated as residual cases in January would give an erroneous morbidity.

The printed form employed for this purpose had spaces for the name of the hospital reporting and the month the report covered. It also gave male cases and deaths; female cases and deaths, as well as total cases and deaths. The causes of death were to be reported according to the International List of the Causes of Death. Spaces for total of all cases and deaths according to diseases given appeared at bottom of form and below these were two lines for the name of the informant and informant's title.

Each case was to be checked in the morbidity column when a diagnosis had been made or at the end of the month. Again, these cases should be checked in event of their death. All returns were to be made to the central office promptly on the first of each month. Morbidity does not include births occurring in the institutions because they are considered healthy individuals unless they become patients by reason of some disease, in which event they are placed in the morbidity class. Births and still-

births are taken care of on a second form which will be considered later.

You will note that no mention is made of residual cases in the hospital at the beginning of the month. It is apparent, therefore, that sometimes there may be a death and no case, or again, for individual months the case fatality would lead to erroneous conclusions. This cannot well be overcome, but a study of the year's rate will counterbalance the discrepancies of the individual months.

The advantage of classifying the cases soon after admission or within the current month will become apparent. This is done to enable the health department to trace the area of non-reportable disease prevalence. Until such a time as there is an actual zoning of hospital activities, such methods will not be accurate. However, it is reasonable to suppose that patients, especially with an acute illness, will apply to the most convenient hospital for treatment. This would mean that the morbidity report of that hospital will show the prevalence of such illness and approximately the prevalence of this form of sickness in that particular area or neighborhood. Therefore, by this means of morbidity reporting, public health officials would be apprised of the prevalence of non-reportable diseases and could direct intensive work to that particular locality.

The venereal diseases were added to the list after careful thought. There seems to be a great aversion on the part of physicians to report this group of diseases. Reluctance on the part of the doctor is not decreased by reporting such diseases by number. Frequent efforts to obtain the coöperation of various physicians in this regard have met with failure and we took this opportunity to insert the specific venereal diseases as a part of our morbidity record. To date various hospitals have reported syphilis and gonococcic infection and we are hopeful of the time when they will continue these reports with a fair degree of regularity.

In compiling the reports for hospitals in a city the size of Philadelphia, it becomes necessary for us to classify the hospitals. Two general headings are possible: first, general hospitals and second, special hospitals. The latter group might again be subdivided into Maternity, Psychopathic, Tuberculosis, Oncologic Hospitals, etc. For each of the special groups a more detailed classification referrable to their special work should be adopted. This must be worked out according to the type of institution and all such reports should constitute a separate study.

While the system was only inaugurated March the first, we have obtained reports from many of the larger hospitals and the number is steadily increasing. At the present time there are approximately twenty hospitals returning our blanks. No attempt has been made so far to analyze the statistics received, as the data available is not sufficient to draw any conclusions.

The second form which was given to various hospitals covered living births, stillbirths, abortions and miscarriages. This is an attempt by the

Division of Vital Statistics to obtain a so called "pregnancy index." It is not our purpose to check birth reporting, as that has now become a state function. We hope to obtain the percentage of hospitalized pregnant women, those who give birth to children prematurely, those who abort or miscarry. By means of this data, regarding these hospitalized cases, we hope to approximate the total number of pregnant cases within the city as well as the percentage of pregnant cases terminating before the nine months period. It has been estimated by various observers that there occurs one abortion to every four pregnancies. However we find that there is no data available on such a subject.

The printed form used for reporting of births gave the name of the hospital and the month and year of reporting. The first column covered Total Pregnant Cases, then Living Births were given according to Full Term and Premature. Still Births were classified as Full, 7–9 Months and 4–7 Months. Miscarriages and Abortions were further classified into 2–4 Months and Less Than 2 Months. Columns were given for Criminal Abortion; Therapeutic Abortion and Unsuspected Cases Discovered at D and C's. On the bottom of this form there also appeared lines for the informant's name and title.

Living births are subdivided into births at full term or those occurring between the seven and nine months period and premature births or those of less than the seven month period. Stillbirths are divided according to the period of intra-uterogestation. Miscarriages and abortions offer the greatest source of error. Some physicians define the products of three months gestation or less as an abortion. Others extend the period to the age of viability (approximately six and one-half months). The term miscarriage is somewhat confused in the mind of the average practitioner of medicine and is often used interchangeably as a synonym for abortion or premature labor. We have defined these terms as follows:

Abortion.—The expulsion of any product of conception prior to four months or subjectively before the age of "quickening." At this period the placenta is not definitely distinguishable from the remainder of the chorion.

Miscarriage.—The expulsion of any product of conception from the age of four months to the age of viability, usually considered to be about six and one-half months intra-utero.

Premature Labor.—The expulsion of any foetus from the age of viability to the full term.

Our definitions have been guided by the most generally applicable views on the subject. These definitions were submitted to the Philadelphia Obstretrical Society and their endorsement asked. From a statistical standpoint it is desirable that we have knowledge of pregnacy to aid us in various deductions concerning the puerperal condition. Why septicemia should be figured on the number of women delivered of living births or even full term living and still births, I cannot appreciate? Rates for this condition as well as other puerperal

conditions should be based on the total number of pregnant women. This we hope to obtain by means of the "pregnacy index" report which is returned to the central office monthly.

In conclusion permit me to say that there is no one so severe a critic of this system as the persons who inaugurated it. However, we believe that it meets the two requirements which are necessary to the establishment of any statistical system, namely: practicability and possibilities for development. At the present time in the City of Philadelphia, hospitals have been swamped with questionnaries on preparedness and various other blanks covering data in all phases of their work, so much so that it is almost impossible to institute a new system for collecting statistics. The only system that can possibly become successful at the present time, is one that is simplicity itself, and that can be used to advantage in the annual tabulation of the institution in which it is employed. We believe this true of our present "Philadelphia Plan" and trust that it shall be the foundation for the standardization of hospital statistics, thus fulfilling the three primary results which we hoped to obtain, namely:

First.—The uniformity of reporting morbidity and mortality in the various hospitals.

Second.—To enable us to study the effect of hospital administration in certain types of disease.

Third.—To aid public health administration by the incidence of non-reportable disease, and the approximate location thereof.

STANDARDIZATION OF ANTITYPHOID VACCINE.

George W. McCoy, M. D.,
Director, Hygienic Laboratory, Washington, D. C.

THE brilliant results from the use of antityphoid vaccine, in the military establishments of this and of other countries, have led to the use of this prophylactic in civil life. The results seem to have been less uniformly satisfactory among civilian than among military populations, though on the whole there is no doubt that the agent has proven of great value.

The early disappointments following the use of the vaccine are believed to be largely attributable to faulty preparation, and some recent experiments have convinced us that the antityphoid vaccine in use in this country has not been as uniformly satisfactory as it might be.

It is not established that any laboratory test now available is a trustworthy criterion of the immunizing power of a vaccine when used in the human species. However, we do know that the vaccine which has proven so satisfactory in protecting large groups of soldiers from typhoid gives very definite antibody response when used to inoculate rabbits.

It is conceivable that a vaccine which failed to give any response in rabbits might be effective in immuniz-

ing man; but the proof would have to be as convincing as that which can be adduced in favor of the agglutinin-producing vaccine.

Thus far our work has been done with the usual vaccine; such modifications as sensitized vaccines, serobacterins and mixed vaccines have not been taken up.

We selected the comparatively simple agglutination test in preference to more complicated serological tests because it was believed that the results of different workers would be more readily comparable, and from the evidence at hand no other procedure seemed likely to give more dependable results. Protection tests, which are always so convincing, were not regarded as practicable with the typhoid bacillus on account of the irregularity and uncertainty of its pathogenic action on lower animals.

There are several points to be considered in connection with the practical application of a standard for the product, they are:

(1) *Effect of various doses:* One of the first problems that presented itself was whether accuracy of dosage was essential, as it is in, for example, the testing of antitoxic serums. The experiment showed that no such accuracy was required as half of a dose or a tenth of a dose gave about the same response as did the full doses—500,000,000 organisms followed by two doses of 1,000,000,000 organisms.

(2) *Mode of inoculation:* Intravenous inoculation was found to give much more rapid agglutinin formation and higher titers than did the subcutaneous route but we lost so many rabbits that the latter method seemed preferable.

(3) *Spacing:* From the manufacturer's viewpoint it is important to know how rapidly the test can be carried out. Some work on this point showed that the vaccine may be given to rabbits at a single dose, 2,500,000,000 organisms, or the doses may be separated by one or three days, and secure a response about as great as when a week or longer separates the doses. When given in a single dose or in three doses at intervals of twenty-four hours, the animals may be bled after eight days. When the interval between doses is three days the bleeding may be done after five days. In either case the testing may be finished in not more than eleven or twelve days.

(4) *Variation in rabbits:* Rabbits react variously to the vaccine, hence it was found necessary to use three on each sample. The variation did not seem dependent on the amount of anti-typhoid agglutinin normally present in the serum of some rabbits.

Technique: The conclusion was reached that each lot of new vaccine should be tested in comparison with a known satisfactory product.

For the agglutination we use the living twenty-hour Rawling culture suspended in physiological salt solution. The density of the suspension is about the same as that of the vaccine.

The serum is diluted so as to give dilutions of 1:25, 1:50, 1:100, 1:200, 1:400, 1:800, 1:1600. This is mixed with an equal volume of the suspension of the organism, shaken and placed at 37° C. for one hour. The

readings are made the next day, the tubes having been kept in the cold room over night.

By always running a control, differences in technique such as density of suspension, age of culture, time of readings, temperature at which reaction is performed and other circumstances which possibly affect the reactions may occur without invalidating the test.

The Hygienic Laboratory will furnish a small amount of vaccine for control purposes to manufacturing laboratories, on application.

The experimental work with vaccines made by city or state laboratories and that made by commercial laboratories showed variations that were entirely inconsistent with the belief that all had been made with the same care or that all were equally useful as immunizing agents.

I would like to suggest here that the manufacture of these agents is not such a simple procedure that it may be taken up without proper equipment including skilled assistance. The vaccine made by one state laboratory was found to be inert and was seriously contaminated with living micro-organisms.

THE NEED FOR A GENERAL SYSTEM OF SANITARY SUPERVISION OF INDUSTRIES IN TIMES OF WAR.

EMERY R. HAYHURST, M. D.,
Assistant Professor of Hygiene, Ohio State University; Consultant in Industrial Hygiene, Ohio State Board of Health, Columbus, Ohio.

Read before the Industrial Hygiene Section of the American Public Health Association, October 17, 1917, at Washington, D. C.

THE great principle of the Great War is acknowledged to be attrition. Endurance is practically all that counts. Capability of maintenance rather than brilliancy of campaign is the principle underlying victory. Furthermore, the state of war is the normal state for the world at present, and indications are that such will be the case for some years to come. In all of this situation we see that producers have a mighty task before them in competing with consumers who are in turn vying with destroyers. Already there is a serious shortage of man-power in the world which is most acute not at the front but at home—at home in the industries.

As sanitarians and students of the principles of the conservation of health, we are confronted by a double question, the first part of which is an old one, "Are lives being saved and deaths deferred?" but the second part of which is much newer, "Are we getting maximum physiological production, or are we, in our patriotic hue and rush, getting less than this and perhaps also incurring pathology?" The increase in the prevalence of industrial accidents and diseases, I am sorry to say, attests to the latter. We are taking new types of workers—women and juveniles—into industry. In spite of warnings and entreaties some industries and some sections of the

country are relaxing standards. Others, again, longer experienced, as at Bridgeport, Connecticut, after trying the relaxation methods in regard to hygienic standards, have discovered the fallacy and have already developed communities which, for output and maintenance, if we can believe published reports, are becoming models for the balance of industrial America. We are putting new classes of workers into every corner of the country and into new industries, as, for instance, is evidenced by the migrations of the negro to the North. Coincidently the various charities, private and public, report an enormous increase in their burdens, drawn largely from the industrial centers. Inability to work is more pauperizing today than in periods of hard times. Thus we see that it is necessary, if we are to come out assuredly victorious, to call in our consultants at once and inquire of them for proper modes of procedure.

Efficiency in industrial service demands strict measures of sanitation just as does efficiency in military service. The great need is maximum output in all our industries, or, negatively stated, avoidance of waste. It must be made known as loudly as we can shout it that sanitation and hygiene are basic items in *absenteeism*, *labor turnover*, *defective output* and *decreased production*.

Now is not the time to give further heed to proclaimers who call for more experiments or more evidence. The past several years, and, indeed, the past several months, have more than established these. A representative of one ammunition firm in Dayton recently attested over his signature that the application of a single suggestion from the State Department of Health regarding ventilation had not only terminated previous health catastrophies, but had jumped the output of the plant 10 per cent forthwith. There have been enough standards established, tried out and found sufficient to be applicable to the whole general industrial field. No doubt, of course, many other important items in industrial sanitation will bob up to be solved during the war, just as surgery, in some relations, for instance, is being quite revolutionized.

The educational value of a general system of industrial sanitation, made nation-wide, can be calculated to be immense; where few now have knowledge, hosts will have it within a few months. Here again we have a lesson from military methods in the matter of training. Such methods educate whole masses quickly, and most thoroughly. Lessons from this war's experience in industrial hygiene will be of immense value in the days after the war. With the troops back home and the workers experienced, community ignorance will no longer exist to passively tolerate typhoid fever and diseases due to lack of education in the principles of hygiene. We have but to get started at once in our American industries to bring this end about. Why wait for wholesale evidences of decreased production due to fatigue, staleness and sickness as was the case in England's first year or two of the war?

Nor is this the time for haphazard-

ness. The tried-out standards of leading plants—those of *highest efficiency on steady man-power*—are none too good for all plants and for all industries. We have not time either, in anything concerning the war, for various states or localities or industries to fix upon what must and will amount to a multiplicity of doubtful methods. Standards and regulations now should be similar everywhere, for like conditions.

The need of an extension of insurance to cover sickness and invalidism as just passed by the National Congress for our soldiers and sailors, is also great for the soldiers of the factories and mines, and particularly is this so in connection with our multitude of employes in small establishments who cannot handle this intricate problem of themselves. We know that nothing reduces preventable afflictions more than establishing some form of compensation against them, since this increases inquiry and such raises the standards for sanitation and hygiene.

I cannot take the time to state what a general system of sanitation should include, except to summarize briefly what it must include: (1) A statement of the type of worker to be employed for the given job and how that kind of worker is to be secured and stabilized; (2) a declaration covering personal hygiene; (3) a system for the prompt care and recovery of those taken sick—including the proper handling of communicable and "common-cause afflictions," those afflictions of geometrical progress—and a means of sustenance until well; and (4) a declaration of sanitary regulations for the work place and the living place, devised to suit our prime war industries first off and our secondary industries immediately thereafter.

In conclusion, I am privileged to state and pleased to announce that, thanks to the foresight of far-seeing individuals, the essential features of this general system have been worked out by a number of committees of qualified persons, largely members of the American Public Health Association, who have been industrially, and practically silently, at work for months upon plans and details for procedure in this national efficiency emergency. At the various sessions of this Annual Meeting many of their principal findings will be voiced and an opportunity given for your valued opinions in regard thereto. Indeed, I am not superseding the facts in the case when I say that at the close of these sessions we trust most of this planning and detailing will be in shape for its immediate presentation to the proper governmental authorities.

REPORT ON THE VISUAL ACUITY OF THE MEMBERS OF THE CORPS OF CADETS, AT THE MILITARY TRAINING CAMP, PEEKSKILL, N. Y.

FREDERIC A. WOLL, PH. D.,
Assistant Professor, Department of Hygiene, College of the City of New York.

AT THE recent Camp of Instruction for boys of the State of New York between sixteen and nineteen years of age, held under the direction of the Military Training Commission of the State of New York, the visual acuity of each cadet was taken. The object was to discover how many of the cadets had normal vision; how many abnormal vision; how many were wearing correcting lenses; how many needed correcting lenses; and of what service the Commission could be to the cadets by offering suggestions and advice relative to the proper and wise care of their eyes and eyesight.

It was possible to make only a simple subjective test, and for that purpose the regulation Snellen Test Types were used, and at a distance of twenty feet. The records conform with the methods of recording visual acuity used by the United States Army and Navy.

It may be of interest to offer here an explanation of that method to those who are unacquainted with it. One's eyesight or visual acuity—the ability to see certain sized letters at the given distance of twenty feet—is expressed by such fractions as 20/20 or 20/40. The fraction 20/20 indicates that the person tested stood at a distance of 20 feet (the numerator), reading the line that should be read at 20 feet (the denominator). The fraction 20/20, therefore, indicates perfect vision. The fraction 20/40 indicates that at 20 feet the person tested was only able to read the line that should be read at a distance of 40 feet. The fraction 20/40 indicates imperfect vision.

The fraction 20/100 indicates that at 20 feet it was possible to read only the line that should be read at 100 feet.

To recapitulate, the figures above the line indicate how far the person was from the test chart; the figures below the line indicate the line which was read on the test chart.

The service requires for the "line" a visual acuity not less than 20/40 in the right eye and 20/100 in the left. For other branches of the service the standard of visual acuity is lower. The hospital service, for example, accepts 20/70 for each eye if correcting lenses bring the vision up to 20/40 in each eye.

The number of cadets in each company registering 20/20 in each eye are shown in the following table:

Company	Cadets	Company	Cadets
A	102	G	107
B	87	H	103
C	96	I	94
D	97	K	97
E	92	L	95
F	101	M	100
Total			1,171

The number of cadets in each company having a slight defect in one eye or in both eyes, but who were able to pass the visual requirement for the "line" are shown in the following table:

Company	Cadets	Company	Cadets
A	9	G	14
B	21	H	16
C	18	I	9
D	13	K	9
E	19	L	9
F	12	M	8
Total			157

Each cadet in the above group was given a brief review of his case and instructions relative to the proper hygiene of his eyes.

The number of cadets in each company having a marked defect in one or in both eyes, wearing glasses, but without them were unable to pass the visual acuity test, are shown in the following table:

Company	Cadets	Company	Cadets
A	19	G	9
B	25	H	15
C	13	I	12
D	17	K	9
E	14	L	14
F	13	M	12
Total			172

Each cadet in the above group was given eye hygiene instruction as a member of either one of the two following groups.

The number of cadets in each company who had a slight or a marked defect in one or in both eyes, but which were corrected to normal by glasses are shown in the following table:

Company	Cadets	Company	Cadets
A	8	G	11
B	15	H	14
C	10	I	15
D	7	K	9
E	5	L	6
F	5	M	6
Total			110

Each cadet in the above group was given definite instructions concerning his eye habits and advised to carefully carry out any instructions that had been given him by his eye specialist.

The number of cadets in each company who had slight or marked defects in one or in both eyes, wearing glasses, but which did not correct their vision to normal, are shown in the following table:

Company	Cadets	Company	Cadets
A	10	G	2
B	11	H	4
C	10	I	2
D	7	K	2
E	6	L	3
F	3	M	2
Total			62

The cadets in this group were each given special and definite instruction relative to their eye defects. The eyes of some in this group had not been examined for periods of time ranging from two to eight years. Others had ill-fitting frames. Some probably never could be given normal vision. All, however, were given individual explanation of their defects and carefully instructed in regard to the hygiene of their eyes.

The number of cadets in each company who had visual defects in one or in both eyes, were unable to pass the visual acuity requirements, and were not wearing glasses, but who were in need of them, are shown in the following table:

Company	Cadets	Company	Cadets
A	9	G	8
B	9	H	10
C	7	I	1
D	11	K	4
E	8	L	7
F	13	M	11
Total			98

Each cadet in this group was given personal and careful instruction relative to his defective vision. Each was made to understand clearly that it was necessary to wear correcting lenses at once for the benefit of his eyes, himself, and his future.

SUMMARY.

	Cadets	%
Total Number Examined	1,598	100.
Passing visual requirements	1,328	83.1
With normal vision	1,171	73.3
With slight defects	157	9.8
Cadets Below Visual Req.	270	16.9
Wearing glasses	172	10.8
Needing glasses	98	6.1
Cadets Wearing Glasses	172	100.
Vision corrected to normal	110	64.0
Not corrected to normal	62	36.0
Receiving individual instruction	427	26.7

CONCENTRATION OF GLUCOSE AND LACTOSE AND VIABILITY OF COLI-LIKE BATERIA.

HELEN A. BURLING, S. B., M. S., *Instructor in Bacteriology*, and MAX LEVINE, S. B., *Assistant Professor of Bacteriology, Ames, Iowa.*

Read before the Laboratory Section, American Public Health Association, October 19, 1917, at Washington, D. C.

PRESCOTT AND BAKER, 1904, observed that in dextrose broth fermentation tubes the number of *Bacillus coli* reached a maximum in sixteen to twenty-seven hours after which they died off, being supplanted by the sewage streptococci.

Clemesha in 1912 found that in peptone, bile-salt, neutral red media, containing one per cent glucose or lactose pure cultures of *Bacillus coli* and *Bacillus aerogenes* began to fall off in numbers after 24 hours.

In a private communication, Dr. Joseph Race of Ottawa, Canada, points out that in a medium containing 1 per cent peptone and lactose and one-half per cent bile salts, *Bacillus coli* is overgrown by *Bacillus aerogenes*-like forms so that after 48 hours incubation at 37 degrees C. the latter may be 18 times as numerous as *Bacillus coli*.

This rapid death of *Bacillus coli* in 1 per cent carbohydrate media raises the question as to the desirability of employing so large an amount of sugar in the presumptive test, particularly if it is to be used also for preliminary enrichment. In the following study it was attempted to determine in a general way the effect of concentration of glucose and lactose on the longevity of coli-like bacteria. Four organisms were employed in the experiments; *Bacillus communis*, *Bacillus communior*, *Bacillus aerogenes*, and *Bacillus cloacae*. Small quantities of 24 hour broth cultures were added to the media which had previously been warmed to 37 degrees C. The medium employed contained one-half per cent Witte's peptone and one-half per cent dipotassium phosphate in distilled water, to which was added, just prior to inoculation, the desired quantity of sterile carbohydrate. The following concentrations of glucose and lactose were tried: 0.3 per cent, 0.5 per cent, 1.0 per cent, 2.0 per cent, and 5.0 per cent. After definite periods of incubation, at body temperature, the number of viable organisms was determined by the dilution method using dextrose broth fermentation tubes to eliminate, as far as possible, errors due to contamination.

EXPERIMENTS WITH GLUCOSE.

The rate of growth of all organisms tested seems to be unaffected by the concentration of glucose. The number of organisms reaches a maximum of 100 to 1,000 million per cc. in about ten hours.

In 0.3 per cent glucose all of the organisms studied were undiminished in numbers after 168 hours (7 days).

In 0.5 per cent glucose *Bacillus aerogenes* and *Bacillus cloacae* persisted in undiminished numbers throughout the experiment. *Bacillus communis* began to die off after 96 hours; falling to 10,000 per cc. in 168 hours (7 days) and to only 10 per cc. on the 8th day (192 hours). *Bacillus communior* is more sensitive and death begins after 48 hours; the number of viable organisms dropping to 10,000,000 in 96 hours (4 days) and to only 100 per cc. in 168 hours (7 days).

The results in 1 per cent glucose were similar to those obtained with one-half per cent, except that fecal forms, *Bacillus communis* and *Bacillus communior* succumb much more quickly. The strain of *Bacillus*

communior observed was particularly affected showing a count of 100,000,000 after 24 hours which fell to less than 10,000 in 72 hours, and sterility was obtained in five days.

With the higher concentrations of glucose, death began even earlier and the rate of death seemed slightly increased but there is no appreciable difference between the effect of 2 per cent and 5 per cent glucose.

The observations on glucose may be summarized as follows: The numbers of viable organisms reaches a maximum in about ten hours. For *Bacillus aerogenes* and *Bacillus cloacae* this number remains practically unchanged for seven days if the concentration of glucose is not over 2 per cent: *Bacillus communis* and particularly, *Bacillus communior*, however, begin to die off in twenty-four to forty-eight hours if the concentration of glucose is more than one-half per cent.

Experiments with Lactose.

The studies with lactose were analogous to those with glucose. The same percentages of carbohydrate were employed and the technique was unchanged. The experimental results were more variable with the disaccharid than with glucose and this was particularly noticeable with *Bacillus aerogenes*. The rate of death of *Bacillus aerogenes* is much greater in a medium containing lactose than in one containing the same concentration of glucose. *Bacillus communior* and even *Bacillus communis* die off somewhat more rapidly than *Bacillus aerogenes*. The effects of increased concentrations of lactose are similar to those observed with glucose.

As the concentration of glucose and lactose increases the time which elapses until the bacteria begin to die off decreases, and after mortality begins, the rate of death is slightly greater with the higher concentrations of carbohydrates. This latter observation needs further detailed study. An explanation for the phenomenon has not been definitely obtained. It is believed, however, that in the higher concentrations of carbohydrates the limiting hydrogen ion concentrations are more quickly reached thereby causing death of the microörganism to begin earlier. It is also possible that the hydrogen ion concentration is a function, not only of the organism, but also of the fermentable substrate and that it is slightly higher in the higher carbohydrate solutions, thus causing a more rapid destruction of the bacteria; but whether or not this is actually true has not been experimentally determined as yet.

Conclusions.

The results of these preliminary studies confirmed the observations of Prescott and Baker and of Clemesha that *Bacillus coli* dies off rapidly in a medium containing 1 per cent of either glucose or lactose and also the observations of Race that after 48 hours incubation at body temperature the Voges-Proskauer positive or Methyl Red negative coli-like bacteria are likely to predominate over the true coli forms.

In media containing 1 per cent glucose or lactose, an incubation period of 48 hours is detrimental to the successful isolation of *Bacillus coli*. This is particularly true if *Bacillus cloacae* is present. It therefore seems desirable that the concentration of lactose, in preliminary enrichment media, should be reduced to one-half per cent which is sufficient for the purpose of the presumptive tests. Isolation or confirmatory tests should be performed as quickly as convenient, preferably in from twelve to twenty-four hours.

Editorial Section

AMERICAN JOURNAL OF PUBLIC HEALTH
EDITORIAL OFFICE: 126 MASSACHUSETTS AVE., BOSTON, MASS.
A. W. HEDRICH, Editor

Editorial Assistants

A. D. HILLER
MERRILL E. CHAMPION, M.D.
E. R. HAYHURST, M.D.
R. R. HARKNESS
R. P. ALBAUGH, M.D.
ARTHUR LEDERER, M.D.
M. P. HOROWITZ, M.D.
P. M. HOLMES, M.D.

Board of Advisory Editors

PETER H. BRYCE, M.D., Ottawa, Canada.
CHARLES V. CHAPIN, M.D., Providence, R. I.
EUGENE R. KELLEY, M.D., Boston, Mass.
J. W. TRASK, M.D., Washington, D. C.
PROF. J. M. ROSENAU, Boston, Mass.
PROF. W. T. SEDGWICK, Cambridge, Mass.
PROF. GEORGE C. WHIPPLE, Cambridge, Mass.
PROF. S. M. GUNN, Paris, France.
W. A. EVANS, M.D., Chicago, Ill.

All expressions of opinion and all statements of supposed facts are published on the authority of the writer over whose signature they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.

NOTICE TO SUBSCRIBERS

SUBSCRIPTION PRICE, $4.00 a year, in advance, to any point in the United States or its possessions. Foreign Countries, 50 cents extra for postage. Canada, 25 cents extra for postage. Single copies, 50 cents.
ADVERTISEMENTS accepted only from reliable firms. Fraudulent and misleading advertisements barred.
IN CHANGES OF ADDRESS both the old and new addresses must be given.
RENEWAL BILLS are sent one month in advance. Prompt attention to them prevents discontinuance from the mailing list. Magazines are not sent beyond the subscription period.
As the MAILING LIST for each month's issue closes on the first of that month, changes of address, renewals, subscriptions, etc., must reach us before that date to be effective with that issue.
COPYRIGHT, 1918, by A. W. Hedrich.

THE ANNUAL MEETING.

The Executive Committee have decided to make the central theme of the 1918 meeting the conservation of the health of the civilian population as a war measure.

The 1917 meeting was devoted to the development of the program for the maintenance of the military forces in war time. Surgeon-generals Gorgas and Braisted met with us and told of their plans. Doctors Trask and Frost informed us of the part in the military program that the Public Health Service and American Red Cross were playing. Each section had its program of military hygiene in which the surgeons of the Army and Navy participated. The military forces have the right of way and we made no mistake in contributing the 1917 meeting to their service.

To win a modern war it is necessary that a nation in its entirety should organize. Contests are no longer limited to armies. To win this war we must maintain the strength and morale of the civilian population as well as of the military forces. In July, 1917, the Germans reported that they had had a little more than one million soldiers killed in action. There are some sections of the civilian population with a death-rate as high as that. In the three years more than three times that many of the civilian population died from natural causes. Even in the deadliest of wars a nation can go through a strife lasting ten years without suffering from a material reduction in population through men killed in action. The greatest source of decrease in population is diminution of the birth-rate. The figures for Dresden are: 1903—births, 15,423; deaths, 8,570; excess of births over deaths, 6,853. 1915—births, 7,371; deaths, 6,406; excess of

births over deaths, 965. Unquestionably the birth-rate in 1918 is far lower than that in 1915. The reports from Germany entire would be equally as bad.

It is important that the morale as well as the numerical strength of a nation shall be maintained. I have no doubt of the valor of our soldiers nor of the maintenance of their health. I do have some doubt of the willingness of our people to withstand the calls that will be made on them. I have very serious doubt of our willingness to go on a basis of health conservation comparable with that of food, fuel and transportation conservation. We are being told that our cause is being seriously imperilled by our lack of ships, arms, munitions and food supplies. We are told that the shortage in these is due to shortage in labor.

For a few years just prior to the war we gained in population by excess of immigration over emigration at the rate of about 1 per cent a year—1,000,000 gain. We gain in population by excess of births over deaths at the rate of about 1 per cent—1,000,000 a year. Our industries, commerce and agriculture is based upon an expected increase of 2 per cent a year in population. One per cent of this has been cut off entirely. When we plunged into war we took nearly 2 per cent of our population and more than 2 per cent of our labor and converted them into soldiers. Naturally there is a shortage of labor.

Is there anything that can be done about it? The various health surveys that have been made show that more than 2 per cent of our population are at all times away from work because of illness. Of those that are able to work a large percentage work at low efficiency because of minor illnesses and disorders. To gain the labor necessary to acquit ourselves creditably there are several things that may be done but none is more logical, none represents so little of revolution in method, as health conservation.

In planning to eliminate waste it is highly desirable that we plan to eliminate some of the waste from preventable illness. The plan is to have some programs of the general meetings and also some of those of the sections cover programs of demography for the civilian population. The general theme will be the maintenance of the numbers and the efficiency of the civilian population.

W. A. E.

THE SANITARY RESERVE BILL.

Senate Joint Resolution No. 63, to establish a reserve of the Public Health Service, was passed by the Senate June 18, 1917, and favorably reported by the Committee on Interstate and Foreign Commerce in the House of Representatives August 30, 1917. On March 4, 1918, it was stricken from the unanimous consent calendar upon the objection of Mr. W. H. Stafford of Wisconsin. It is now pending in the House of Representatives, being on the calendar of the "Committee of the Whole House on the State of the Union" and will probably be brought up for consideration when the Committee on Interstate and Foreign Commerce gets the call on calendar.

This resolution received the approval of the Conference of State and Territorial Health Officers at their meeting held in Washington, D. C., April, 1917, and the approval of the Conference of State and Provincial Boards of Health. The Medical Section of the Council of National Defense referred it with favorable recommendation to the Council of National Defense which recommended its enactment by Congress.

The purpose of the legislation is (1) to effectively coördinate the activities of national, state, county, and municipal health organizations; (2) to provide for the temporary appointment of additional highly qualified sanitarians in the

national health organization to meet from a health standpoint the unusual situation incident to the war; (3) to fix the status of certain officers already in the Public Health Service in order that their services may be more advantageously utilized and coördinated with the services of the temporary appointees; and, (4) to provide certain additional duties in the sanitation of ports and places in their civil relations to the mobilization of military and industrial forces.

The passage of this resolution is of the greatest importance at this time. Reasonable measures for safeguarding the health of the people are important at all times but of the greatest importance in times of war when physical fitness means so much to success. Some of the reasons for greatly increasing the civilian health forces may be mentioned as follows:

With an increase in the civilian health forces, as contemplated by this resolution, the federal, state and local health authorities may more effectually meet the increased demands which are being made upon them to protect the country from the spread of communicable diseases incident to the assembling of thousands of men from different parts of the country in camps and training stations. The immediate enactment of the legislation contemplated in this resolution is necessary in order that the organization required may be effected in time to minimize the chances of the development of serious conditions incident to summer season around national camps and shipyards.

In addition to providing funds necessary for disease prevention work Congress should bear in mind that the provisions made in the resolution for commissioning health officials in the Public Health Service Reserve are necessary under present conditions of organization and discipline in order to obtain the same degree of efficiency and obedience to orders as exists in military organization. Inasmuch as the officers of the civil sanitary reserve corps are often associated with officers in the Army and Navy, the necessity for giving them civil commissions of related rank is obvious. The operation of the resolution is limited to the period of the war. Its enactment is in the nature of a military necessity.

A. W. H.

TRAINING FOR PUBLIC HEALTH.

The director of a public health laboratory who was in search of an assistant recently complained that while many applicants were well trained in chemistry, but few were familiar with the bacteriological and pathological examinations which are part of the routine work of public health laboratories.

It is to be regretted that the study of bacteriology has not as yet found its way into many general university courses. Since this subject is intimately connected with the events of everyday life, the time will probably come when bacteriology is as frequently found even in high school curricula as physics, chemistry or general biology. From general bacteriology to pathogenic bacteriology will then be a short step.

It is encouraging to note that professional training facilities in public health are making rapid progress. Many of our readers will probably be surprised to learn that there are now about a dozen schools for health officers in this country. At least one of these gives a correspondence course.

An article in one of the coming issues will review this subject in detail.

A. W. H.

Association News.

By A. W. Hedrich, Secretary.

Next American Public Health Association Meeting at Chicago.—At a meeting of the Executive Committee, held at New York City, on March 22, it was voted to hold the next annual meeting of the Association at Chicago, Illinois, October 14–17, 1918, inclusive. It was felt necessary to select a city easily accessible to a large number, and Chicago meets this requirement admirably. The last meeting of the Association held in Chicago was that of 1893.

The central theme of the meeting will be "The Health of the Civilian Population in War-Time." At the Washington meeting attention was centered upon the health of the military. Many agencies, official and voluntary, are now working to protect the health of the soldier, and it is proper that we should make an intensive study of the health problems of the stay-at-homes and strive to solve them.

Program chairman of the Sections are requested by the Executive Committee to shape their programs with this object in mind.

✱

Meeting for Board of Directors.—The Executive Committee deems an early meeting of the Board of Directors necessary, and has asked the Secretary to ascertain how many Directors could attend a meeting at Chicago at the time of the convention of the American Medical Association, June 10–14, 1918.

The Executive Committee voted to present at the next annual meeting a resolution urging that expenses to the meetings of Directors be paid by the local boards of health represented. The justice of this stand requires no argument.

Some of the projects which should be considered by the Directors are: the revision of the constitution, the determination of new propaganda work, the organization of state health societies and especially a plan to increase the membership of the Association.

A list of the Directors is given on page 313 of this issue.

✱

The Membership Drive.—Provisions are being made for conducting a membership campaign in a small district as a basis for the national campaign which is contemplated for the near future.

The statistics which are available indicate that there are in this country and Canada over 20,000 public health workers to whom membership in the Association holds forth great advantages. At present we have only 1,700 members.

For the great drive by our members which will come later, it is planned to divide the country into districts—possibly twenty or thirty each in charge of a district campaign manager. The directors of the Association will make nominations for campaign managers, and volunteers are also called for.

The next issue of the Journal will give further details.

HELP WANTED.

In order to help relieve the shortage of sanitarians due to the war, free help wanted announcements will be carried in this column until further notice. Copy goes to the printer on the first of each month.

In answering keyed advertisements, please mail replies separately.

The Health Employment Bureau also sends lists of applicants to prospective employers without charge.

Wanted: Recent graduate of Class "A" medical college, with training in bacteriological and serological work for laboratory work in large and reputable manufacturing company in Middle West. Address C. L. E. No. 118, care of this Journal.

The United States Public Health Service is greatly in need of the services of competent sanitarians, particularly medical officers, sanitary engineers and scientific assistants. Salaries vary from $1,800 to $2,500 per annum. Applicants should address Surgeon General, United States Public Health Service, Washington, D. C., stating in full experience and training which they have had. Mention this Journal.

Wanted: Public health nurse in Minnesota. Salary, $75 to $80 per month with increase. Address H. L. No. 117, care of this Journal.

Wanted: Assistant bacteriologist and pathologist for the South Dakota State Health labora-

tory. Graduate in medicine preferred. Must have had some special training and experience in the above lines of work. Give details of training and experience in first letter. Salary, $1,600 per annum, with rapid financial advancement upon demonstration of ability. A good live assistant not afraid of work is needed. Address Mortimer Herzberg, M. D., Director, Vermillion, S. Dak.

Wanted: General inspector of food handling establishments in Southern state for scoring and inspection of restaurants, markets, grocery stores, and soda fountains. Salary, $1,500 per year. Address A. A. C. No. 111, care of this JOURNAL.

Wanted: Chief for the Bureau of Vital Statistics in South Atlantic State. Salary, $2,400. Address C. H. W. No. 115, care of this JOURNAL.

Wanted: Whole-time health officer in Texas city who is competent as a bacteriologist to at least analyze water and milk and advise as to treatment of water. A man of some experience in this line and of undoubted administrative capacity desired. Salary, $150 per month. Address W. P. A. No. 114, care of this JOURNAL.

Wanted: Superintendent of nurses in Middle West City of 35,000 for welfare work. Should be capable of tactfully meeting all conditions in the district and of directing several nurses. Salary, $150 to $175 per month with increase. Address L. H. G. No. 116, care of this JOURNAL.

Wanted: Young man to help with routine city public health work in New York State, also during two months of year, half a day, to teach elementary bacteriology in medical school. A man physically disqualified for military service preferred. Salary, $1,500. Address O. T. No. 113, care of this JOURNAL.

PERSONAL NOTES.

Mr. E. Mayo Tolman, of the State Health Board, Charleston, W. Va., has obtained a leave of absence for three months to go to Guatemala, under instruction of the American Red Cross, to engage in reconstruction work made necessary by the recent earthquake.

Dr. Millard Knowlton of Boston has been appointed captain in the Medical Reserve Corps of the United States Army.

Mr. Franz Schneider, Jr., former Associate Health Editor, *The Delineator*, New York City, has been appointed a captain in the National Army. He has been assigned to duty in the Statistics Branch, Executive Division, General Staff Corps. .

Mr. C. R. Newell, of Ripley, N. Y., has been commissioned a First Lieutenant in the Sanitary Corps of the National Army.

*

The following applicants have been elected to membership in the American Public Health Association in March 1918:

Louis Wm. Allard, M. D., Billings, Mont., Physician and Surgeon, Full-time Health Officer.

Richard E. Lee, Sc. D., Meadville, Pa.

John K. Gore, Prudential Insurance Co., Newark, N. J., Vice-President.

Gardner S. Williams, Ann Arbor, Mich., Civil, Hydraulic and Sanitary Engineer.

Annetta J. Nicoll, Topeka, Kansas, City Bacteriologist and Chief Food Inspector.

John W. Tapper, Lynn, Mass., Chairman, Board of Health.

Grover C. Goodwin, M. D., Florence, S. C., Health Officer.

Clay Products Association, Chicago, Ill. (Corporate Membership).

Lucian N. Yost, B. S., Ph. G., M. D., Fairmont, W. Va., County Health Officer.

Dr. Edward E. Johnson, M. D., San Francisco, Cal., President of Pacific Wassermann Laboratories, Professor of Serology and Laboratory Diagnosis, College of Physicians and Surgeons.

P. A. Van der Meulen, Ph. D., Philadelphia, Pa., Research Chemist.

Camille E. Dorisy, Seattle, Wash., Sanitary Engineer.

H. H. Brinkerhoff, M. D., Jersey City, N. J., Director of Medical Inspection, Public Schools.

Wm. H. Chase, M. D., Cordova, Alaska, Assistant Health Commissioner, Alaska.

G. E. P. Wright, Pittsburgh, Pa., Safety and Sanitary Engineer.

Robert H. Riley, M. D., Cumberland, Md., Deputy State Health Officer.

Louisa E. Perritt, R. N., Globe, Arizona, Instructor in Hygiene, Public Schools.

Wm. T. Scarboro, D. V. M., Winston-Salem, N. C., Dairy and Food Inspector.

Harvey G. Elledge, M. A., Pittsburgh, Pa., Industrial Chemist.

Leslie B. White, Little Rock, Ark., Bacteriologist.

AMERICAN PUBLIC HEALTH ASSOCIATION

OFFICERS AND DIRECTORS 1917-1918

OFFICERS

President, Charles J. Hastings, M. D., Toronto, Ont.
First Vice-President, George M. Kober, M. D., Washington, D. C.
Second Vice-President, Manuel S. Iglesias, M. D., Vera Cruz, Mex.
Third Vice-President, Guilford H. Sumner, M. D., Des Moines, Iowa.
Treasurer, Lee K. Frankel, Ph. D., New York City.
Secretary, A. W. Hedrich, Boston, Mass.

EXECUTIVE COMMITTEE

Charles J. Hastings, M. D., Toronto, Ontario.
Lee K. Frankel, Ph. D., New York City.
W. A. Evans, M. D., Chicago, Illinois.
Peter H. Bryce, M. D., Ottawa, Ontario.
Guilford H. Sumner, M. D., Des Moines, Iowa.
A. W. Hedrich, Boston, Massachusetts.
J. N. Hurty, M. D., Indianapolis, Ind.

SECTION OFFICERS

Sanitary Engineering

Chairman, Mr. George S. Webster, Philadelphia, Pa.
Vice-Chairman, Mr. E. A. Fisher, Rochester, N. Y.
Secretary, Mr. Samuel A. Greeley, Chicago, Ill.

Food and Drugs

Chairman, Mr. Lucius P. Brown, New York City.
Vice-Chairman, Mr. John P. Street, New Haven, Conn.
Secretary, Dr. James O. Jordan, Boston, Mass.

Vital Statistics

Chairman, Dr. J. W. Trask, Washington, D. C.
V.Chairman, Louis I. Dublin, Ph.D., New York City.
Secretary, Mr. Richard C. Lappin, Washington, D. C.

Sociological

Chairman, Dr. Wm. F. Snow, Washington, D. C.
Vice-Chairman, Dr. Louis I. Harris, New York City.
Secretary, Dr. Ira S. Wile, New York City.

Public Health Administration

Chairman, Dr. Oscar W. Dowling, New Orleans, La.
V.Chairman, Dr. Francis E. Fronczak, Buffalo, N. Y.
Secretary, Mr. Chester H. Wells, Montclair, N. J.

Laboratory

Chairman, Dr. George W. McCoy, Washington, D. C.
V. Chair., Dr. R. B. Fitz-Randolph, Trenton, N. J.
Sec., Dr. Chas. Krumwiede, Jr., New York City.

Industrial Hygiene

Chairman, Dr. George M. Price, New York City.
V. Chair., Dr. J. W. Schereschewsky, Pittsburgh, Pa.
Sec., Dr. Francis D. Patterson, Harrisburg, Pa.

BOARD OF DIRECTORS 1917-1918

DIRECTORS ELECTED BY THE ASSOCIATION

Directors whose term expires 1920

John B. Anderson, M. D., Spokane, Wash.
M. S. Fraser, M. D., Winnipeg, Man.
J. N. Hurty, M. D., Indianapolis, Ind.
C. S. Caverly, M. D., Rutland, Vt.
M. M. Seymour, M. D., Regina, Sask.
L. A. Galarreta, M. D., Havana, Cuba.
P. M. Hall, M. D., Minneapolis, Minn.
J. H. Landis, M. D., Cincinnati, Ohio.
B. L. Arms, M. D., Jacksonville, Fla.
C. J. McGurren, M. D., Devil's Lake, N. D.

Directors whose term expires 1919

Hoyt E. Dearholt, M. D., Milwaukee, Wis.
Raymond B. Fitz-Randolph, M. D., Trenton, N. J.
W. A. Sawyer, M. D., Sacramento, Cal.
Henry F. Vaughan, D. P. H., Detroit, Mich.
John S. Fulton, M. D., Baltimore, Md.
John D. Robertson, M. D., Chicago, Ill.
Wilmer R. Batt, M. D., Harrisburg, Pa.
Henry Boswell, M. D., Booneville, Miss.
James A. Hayne, M. D., Columbia, S. C.
A. J. Douglas, M. D., Winnipeg, Manitoba.

Directors whose term expires 1918

J. T. Black, M. D., New London, Conn.
Livingston Farrand, M. D., Boulder, Colo.
Guilford H. Sumner, M. D., Des Moines, Ia.
C. Harris, M. D., Memphis, Tenn.
Charles V. Chapin, M. D., Providence, R. I.
Oscar W. Dowling, M. D., New Orleans, La.
William H. Park, M. D., New York, N. Y.
William M. Cobleigh, Bozeman, Mont.
M. P. Ravenel, M. D., Columbia, Mo.
P. S. Schenk, M. D., Norfolk, Va.

Past Presidents (Directors Ex-Officio)

Stephen Smith, M. D., Skaneateles, N. Y.
Frederick Montizambert, M. D., Ottawa, Ontario.
Samuel Durgin, M. D., Millbrook, Mass.
Emmanuel P. Lachapelle, M. D., Montreal, Quebec.
Eduardo Liceaga, M. D., Mexico, City.
Henry Mitchell, M. D., Asbury Park, N. J.
Peter H. Bryce, M. D., Ottawa, Ontario.
Frank F. Westbrook, M. D., Vancouver, B. C.
Richard H. Lewis, M. D., Raleigh, N. C.
Gardner T. Swarts, M. D., Providence, R. I.
Robert M. Simpson, M. D., Winnipeg, Manitoba.
John N. Hurty, M. D., Indianapolis, Ind.
Rudolph Hering, D. Sc., New York, N. Y.
William C. Woodward, M. D., Washington, D. C.
William T. Sedgwick, D. Sc., Cambridge, Mass.
John F. Anderson, M. D., New Brunswick, N. J.
W. A. Evans, M. D., Chicago, Ill.

Representatives of Sections to Board of Directors

Industrial Hygiene, Dr. Alice Hamilton, Mackinac Is., Mich.
Sanitary Engineering, George S. Webster, Philadelphia, Pa.
Food and Drugs, J. P. Street, New Haven, Conn.
Sociological, Dr. Donald B. Armstrong, Framingham, Mass.
Pub. Health Adm., Dr. F. X. Mahoney, Boston, Mass.
Laboratory, Prof. F. B. Gorham, Providence, R. I.
Vital Statistics, Dr. W. H. Guilfoy, New York City.

Books and Reports Reviewed.

Examination of Milk for Public Health Purposes. *By Joseph Race, City Bacteriologist and Food Examiner, Ottawa, Chairman of Committee on Standard Methods of Analysis of Canadian Public Health Association. Member of Committee on Municipal Food Administration; American Public Health Association. New York, John Wiley & Sons, 1918. Price, $1.75.*

This little book of 224 pages lives up to its intention of being a practical handbook for those engaged in the chemical and bacteriological examination of milk for public health purposes. Instead of attempting to cover the whole field of milk production, handling, control and examination, this volume frankly deals with the methods of examination, prefacing these methods only by such facts as are necessary and condensing these into very brief form. The first chapter deals with the constituents of milk and the normal composition of milk, presenting in 65 pages a general summary of the most important facts which have been brought out in the many years that milk has been under investigation, on the composition of milk and the influence of various agencies upon it. In this statement unusual emphasis is placed upon the occurrence in the milk of enzymes and immune bodies, and the importance of these biological constituents is very clearly set forth. These chapters end with a brief but excellent statement of the author's views on milk standards. The third chapter deals with the chemical examination of milk and presents in very practical and brief form the numerous methods for analysis for fats, proteids and serum. A portion of the chapter deals with the detection and estimation of preservatives and coloring matters. The enzymes again come in for treatment and methods are explained for the determination of the reductase, peroxidases, catalases and other enzymes which the author asserts are always present in normal milk. In chapter four less than twenty pages are devoted to the bacteria in milk and in this small compass the most important information for the public health student or official is given. The next chapter deals with the enumeration of bacteria in milk and presents a variety of methods including the so-called Standard Method of the American Public Health Association. The sources of error of the methods now in use are pointed out and in many instances suggestions are given for the reduction of the error to a minimum. Chapter six, dealing with excremental organisms, takes up the numbers of the *B. coli* group, *Bacillus enteriditis sporogenes* and the streptococci of fecal origin. In this chapter several methods, which have been developed by the author and which are probably not widely used elsewhere, are described, especially a method making use of an agar medium containing neutral red and bile salts. Then follows a chapter on pathogenic organisms in milk in which the streptococci of diphtheria bacillus, typhoid bacillus and tubercle bacilli are treated. A brief chapter considers cells, dirt and debris and points out the extent to which the cells may be regarded as normal constituents of milk and the methods of examination and enumeration of the same. The final chapter deals with pasteurized milk and presents a large number of tables explaining in lucid form the essential facts of many investigations.

The book is rich throughout in tables which are for the most part expressed very clearly and bring out in a few lines the data which it might require pages of text to develop. An appendix, giving the methods of preparation of several kinds of culture media and tables to be used in the calculation of results closes the volume. This little book may be characterized as "meaty," and it should surely find a place in every working laboratory where the chemistry and bacteriology of milk is an important part of the work undertaken. The author is to be congratulated on having put such a large amount of information in such small space and in such readable form. Typographical errors are very rare, but two having been noted in a hasty excursion through the whole volume. It is distinctly a book which can be marked "recommended for purchase."

Samuel C. Prescott.

Training and Rewards of the Physician. *By Richard C. Cabot, M. D. J. B. Lippincott Company. Price, $1.25.*

Cabot's "Training and Rewards of the Physician" will prove a disappointment to the man who reads it to learn of the technical side of such training. He will be disappointed also if he looks for statements dealing with concrete rewards. He will find much on the philosophy, psychology and sociology of the subject, and that is what he should have expected from a book by Cabot on this subject.

The profession of preventive medicine will be especially interested in the chapters dealing with the Preparation for Public Health Work, the Influence of Important Public Health Crusades on Medical Development and Medical Practice, and the Private Practitioner's Competition with Group Medicine.

The preparation for public health work is treated in four and a half pages, two of which are devoted to sanitation in the Canal Zone. The remaining two and a half pages are given to a very lucid statement of the similarities of public health administrative work to engineering. The influence of health crusades on medical practice has been good. "A change in our beliefs upon this matter (the duty of the patient to understand his disease and to help himself) is now reacting favorably I think not only upon the development of the private practitioner towards better knowledge and control of tuberculosis." "The doctor is stimulated and jacked up by the modern anti-tuberculosis crusade. . . . Surely this is for the good of the profession as well as of the public." In speaking of supervision of private contagious disease cases by health departments he says—"This sort of checking up by experts is very salutary for all of us."

W. A. Evans, M. D.

✠

Disasters and the American Red Cross in Disaster Relief. *By J. Byron Deacon. Russell Sage Foundation, 1918. 230 pp. Price, 75 cents.*

"Disaster" is almost a catalogue of headlines. The *Titanic*, Cherry-Mines, the *Eastland*, the Ohio Valley Flood, San Francisco, Salem, Chelsea, Omaha, each brings its own special memory of horror; but whether the disaster is sea, flood, mine, fire or tornado, the needs of the sufferers from them are much alike and one force has shown its power to handle promptly, kindly and efficiently these tragic emergencies.

The Red Cross has not gone blindly to work to meet each problem as if it were fresh and without precedent. Rather it has used its experience in every disaster to make it more ready to handle the next one which comes, inevitably. The first chapters of the book deal with the specific measures taken in all the tragedies since San Francisco, and these chapters constitute the first report made from original documents. In the latter chapters the principles which the Red Cross has worked out are given clearly and in such form as to be valuable for reference by any person called upon to do similar work. The "Social Worker" rather than the nurse is most needed. Perhaps the most emphasized single feature is the importance of *adequate* relief administration by *local* agencies. The chart showing graphically the arrangement of all needed committees is very valuable. In the work of rehabilitation and reconstruction which will follow this great present disaster of war such a book as Mr. Deacon's will be of the utmost service.

Eunice B. Armstrong.

✠

A Short History of Science. *By W. T. Sedgwick and H. W. Tyler. New York: Macmillan, 1917. Pp. 15+474. Price, $2.50.*

The apparent crumbling away of foundations that have long seemed stable makes books of this sort particularly valuable just now, when the future of the world seems filled with uncertainty. It is well now and again to remind ourselves of the great and enduring progress that has been made by the human race, and especially to remember that it is progress of a kind that is inadequately characterized by the word "material." The time will come when the great calamity that has overtaken the world in our day will fall into its proper perspective and will not over-shadow all our thoughts and energies as it does at the present moment. The history of science as presented by Professors Sedgwick and Tyler is an inspiring record of the achievements of the human mind. The assurance that it gives of the enduring character of our scientific belief and of the essential humanity of the scientific spirit is welcome to all of us in these troubled times.

The authors' treatment of the history of science is broad and stimulating. The combination of expert biological with expert mathematical and physical knowledge is a particularly fortunate equipment for the production of a comprehensive history of science. The qualifications of the authors are a guarantee of the essential accuracy and wise choice of material. The body of the book is rich in matter of surpassing interest to every educated man. The style is clear and flowing. Typographical errors are practically absent. The reader will find particularly interesting Chapter VII, *The Roman World*, and Chapter XVII, *Some Advances in Natural Science in the Nineteenth Century*. Among the many excellent features of the work are a chronology and admirable list of reference books and a series of appendices containing memorable landmarks such as the Oath of Hippocrates, Harvey's dedication of his work on the circulation of the blood, and extracts from Jenner's work on vaccination. The whole book is of great value to the student of science both for consecutive reading and for reference.

Edwin O. Jordan.

A Manual of Personal Hygiene. *By George D. Bussey. Ginn & Co., 1917. 156 pp. Cloth. Price, 60 cents.*

This manual is prepared for high school students, giving brief and specific directions for the conduct of daily life, with the expectation that additional information and illustrative material will be supplied by the teacher. The facts are concisely stated in the form of definitions and directions. No attempt is made to give the physiological basis of the rules laid down or to discuss points upon which there is difference of opinion.

Much practical information for the high school student is set forth in brief chapters dealing with the following subjects; The Importance of Hygiene, Heat and Energy, Breathing, Eating, Drinking, Sleeping, Exercise, The Mind, The Teeth, The Skin, The Hair, The Clothing, Shoes, The Nose and Throat, The Chest and Lungs, The Eye, The Ear, Tobacco and Harmful Drugs, Alcohol and Patent Medicine, Bacteria, and Emergencies.

C. E. Turner, M. A.

Public Health Notes.

Abstracts by Merrill E. Champion, M. D., and M. P. Horowitz.

Plan to Save 100,000 Children.—Saving the lives of one hundred thousand children is the goal of the child welfare drive inaugurated by the Children's Bureau at Washington. The aim of the campaign is "Public Protection of Maternity and Infancy." The suggested methods by which this may be accomplished are as follows:

"*First*—The registration of births so that there may be an immediate record of every child born; and nursing and medical skill may be provided wherever family income does not permit its being secured independently.

"*Second*—For every mother prenatal care, necessary care of doctor and public nurse at confinement, and after care.

"*Third*—Children's conferences where well babies can be taken periodically to be weighed and examined, and clinics where sick children may be given medical advice.

"*Fourth*—The organization of state and city divisions or bureaus of child hygiene.

"*Fifth*—The guarding of the milk supply that every child may have his quota of clean, pure milk.

"*Sixth*—An income making possible decent living standards."

As the result of concerted efforts it is hoped that the United States, as yet unexhausted by the war, may show even greater results in saving the lives of babies than have the European countries—and they have done well.

(*M. E. C.*)

✠

Some Lessons from the Housing Problem in England.—F. A. Dallyn, C. E., in an article in the Canadian *Public Health Journal* for January, 1918, reviews the housing problem in England as it existed about 1851, and traces the important developments in the solution of that problem.

Conditions then existing for the working classes were indeed appalling, and although conditions are still bad in many places, there is no question that advancement has been made, particularly in those matters that affect the health of the occupants, and the sanitary condition of the home.

Nevertheless, overcrowding still exists to an abnormal degree. Thus in 1911, 22.9 per cent of the population of Dublin were living in one-room tenements, with an average of 3.18 persons per room. In Glasgow 46.9 per cent of the population were living in two-room tenements with an average of 2.43 persons per room. In Edinburgh, 29.6 per cent of the population were living in two-room tenements with an average of 2.43 persons per room. In Edinburgh, 29.6 per cent of the population were living in two-room tenements with an average of 2.16 persons per room. It is also true that over 40 per cent of the population of Glasgow, Edinburgh, Dublin and London live in tenements of three rooms or less.

The tendency today is to build garden cities, and to practice the principles of town planning. Housing, as a public health problem, would not exist today, if the sanitary laws were enforced. The housing problem has become a great social problem. It is urged, therefore, that builders and architects should not only consider the house, the street, and the town from the point of view of structure, but also from the social standpoint; and that provision be made in the universities for the instruction of young men in the principles of town planning. (*M. P. H.*)

✦

Venereal Disease in Massachusetts.—Writing in the *Public Health Reports*, issue of February 22, 1918, Assistant Surgeon General, Allan J. McLaughlin, formerly Health Commissioner of Massachusetts, outlines a statewide plan for the prevention of venereal diseases. He calls attention to the fact that a complex program is necessary if a successful campaign is to be waged against these diseases. Such a program will of necessity have two phases: one, a sanitary problem, to be handled directly by the health departments; and the other a moral, social and economic problem which to a great degree can best be handled by other agencies than the health departments.

Certain essentials of the program are indicated. Free diagnostic facilities such as Wassermann Laboratories should be established. Free treatment facilities should also be offered. In Massachusetts this is being accomplished through "state approved" venereal clinics situated at convenient places throughout the state. These clinics serve not only as centers for treatment but also for the distribution of free arsphenamine. Certain minimum requirements for these dispensaries are described such as equipment, personnel, records and laboratory service.

Emphasis is laid on the educational value of these dispensaries and on the need of general educational effort to impress upon the public the importance of the subject. This may be done through lectures, placards, etc. Repressive measures for the control of prostitutes are also necessary and here is needed the cooperation of the legal authorities.

Under the heading "measures which require legislation" may be grouped, according to the writer:

(1) Reporting of venereal diseases;
(2) Elimination of quacks;
(3) Counter-prescribing in drug stores;
(4) Examination and treatment of prisoners.

The method of reporting which seems most likely to succeed is based on the so-called West Australian system. Infective cases are reported by number but with the additional proviso that they are to be reported by name if the patients fail to continue treatment. (*M. E. C.*)

✦

A Popular Book in Household Biology.—Announcement is made of the publication of the September, 1917, *Bulletin* of the North Carolina State Normal College, by Dr. E. W. Gudger. The bulletin is really a "Primer of Household Biology" and deals not only with elements of the science of life, particularly as it affects the household, but also considers some of the fundamentals of hygiene and sanitation and the maintenance of soil fertility. (*M. P. H.*)

✦

Comparison of Draft Rejections.—The statement sometimes made that the average of health of the young men of the country is lower than it was at the time of the Civil War, as shown by the percentage of rejections in the recent selective conscription, has been disproved by the showing of Provost-Marshal-General Crowder in

his report to the Secretary of War. Of the 2,510,706 men examined in the first call of the present draft, 730,756 were rejected on physical grounds, which is 29.11 per cent. In the Civil War 31.69 per cent of the men drafted were rejected. Commenting on this editorially, the *Ohio Public Health Journal* quotes General Crowder to the effect that in view of the advance in standards of medical diagnosis since the Civil War, the figures indicate a decided improvement in the physical condition of the young men of the nation. (*M. E. C.*)

*

Defective Development of Growing Children in War Time.—In an article appearing in *Medical Insurance and Health Conservation* for February, 1918, Dr. Henry Dwight Chapin points out the national danger of the war on growing children. Already, in all the belligerent countries, there has been a marked increase in illegitimacy, juvenile delinquency, dependency, and under-nourishment of children. In 1916, Sir George Newman estimated that at least 10 per cent of the children of England and Wales were under-nourished. It behooves us to give this matter serious attention, for under-nourishment among our own children is also prevalent. Dr. Chapin in 1905 showed that of 1,400 school children in New York that were examined, 50 per cent started the day with either no meal or one that was inadequate. The causes for the under-nourishment of the children seemed to be faulty economic practice, physiological ignorance and poverty. With the rapid increase in the price of foods since the outbreak of the war, and the comparatively slight increase in wages, under-nourishment is doubtless more prevalent today. The increase in certain common foods from 1916 to 1917 is as follows. Beef, 48 per cent; lard, 74 per cent; cheese, 50 per cent; peas, 104 per cent; potatoes, 88 per cent; beans, 55 per cent; wheat, 76 per cent; corn, 57 per cent; oats, 60 per cent; flour, 85 per cent; corn meal, 51 per cent; milk, 67 per cent. It is estimated by the New York Association for Improving the Condition of the Poor, that the cost of food representing 65,000 calories for a family of five from 1915 to 1917 is as follows:

November, 1915	$5.84
November, 1916	7.41
March, 1917	8.24
May, 1917	$8.40
November, 1917	8.97

The increase in wages from 1907 to 1916 has been 16 per cent.

It is suggested that under-nourished children should be recognized during the regular medical examinations, and that the existing relief agencies should be called on to help solve the problem. It is also recommended that education should accompany relief. (*M. P. H.*)

*

Serum Therapy in Epidemic Cerebrospinal Meningitis (*La Pediatria*, 1917, xxv, p. 321).—A. Longo draws the following conclusions from the epidemic in Catania in 1915: During the epidemic, which consisted mainly of mild cases, serum therapy was very efficacious, for in the municipal hospital, where it was largely adopted, the mortality was 33.7 per cent, whereas in the town, where the majority of cases were not thus treated, it was 62.2 per cent. Moreover, in 19 cases thoroughly treated there were no deaths or complications, while in 3 cases insufficiently treated (1 or 2 injections at most) and in 12 untreated only 2 complete cures resulted, 7 died, and 6 developed serious complications of the nervous system—*i. e.*, deafness and dementia, general convulsions, hydrocephalus and blindness. Among the factors which contribute to the inefficiency of serum therapy in some cases great importance is attached to the eventual existence of adhesions more or less numerous or extensive among the folds of the lepto-meninges which may frustrate the sero-therapeutic action by cutting off tracts of the meninges. The existence of such adhesions may perhaps also explain the frequence of relapses. Nephritis is no contraindication to the use of serum. The author met with severe cases of serum disease, and considers that the problem of its prevention is not yet solved.— *The British Journal of Children's Diseases.* (*M. E. C.*)

*

Report on the Mortality of Mothers in Childbirth.—According to *Medical Insurance and Health Conservation* for February, 1918, the Metropolitan Life Insurance Company has been able to diminish the number of deaths among its female policyholders, resulting from diseases and conditions incident to childbirth. This is due in a large measure to the extent of visiting

nurse service, both for prenatal care and care after childbirth, which the Company maintains. Out of about 2,750,000 female policyholders between the ages of 15 and 44, most of whom are married, 1,769 deaths occurred in 1916 due to childbirth. The following table is of interest because of the accomplishment which it tells:

MORTALITY ASSOCIATED WITH CHILDBIRTH.

Year.	Death-rate per 100,000 Females, 15–44 Years Old.	
1911	70.1	white
	88.4	colored
1916	62.6	white
	70.4	colored

The causes of death were: puerperal septicemia, 41 per cent; albuminuria and convulsions, 29 per cent; accidents of labor, 10 per cent; accidents of pregnancy, 8 per cent; puerperal hemorrhage, 8 per cent. (*M. P. H.*)

*

Welfare Work for Infants in Belgium.—Van Roy states that in no other country is the system of infant consultations so extensively applied as in Belgium. He is convinced, he says, that four-fifths of the pediatrists of Belgium have an office for giving free advice to infants. They usually have two or three rooms equipped for the purpose, apart from their regular office, a waiting room, the room in which the children are undressed and weighed and the consulting room. Each infant has its card, and a nurse helps to weigh the children. This is usually some charitable volunteer. All the hospitals have these free consultations. At Antwerp the "Associated Charities" has five in different parts of the city and prospective mothers are visited and looked after. Milk and gruels are distributed, and the infant mortality of Antwerp is exceptionally low. (*M. E. C.*)

*

Welfare Work and Public Health.—In an article appearing in the *Journal of State Medicine* for February, 1918, B. Seebohm Rountree emphasizes the need for the conservation and protection of a nation's health endurance, energy, and physical and mental fitness. In particular the relationship of welfare work in industry and national vigor and happiness is emphasized.

It is believed that many physical wrecks and deaths in youth or in the prime of life can be saved by intelligent and adequate attention in the early stages of the history of these cases. Welfare work is defined as an organized attempt on the part of employers of labor, so far as it lies within their power, to increase the nation's assets of health, strength, fitness, staying power and the life, and to diminish all unnecessary liabilities, all leakage, and wastage, and breakage, all squandering of vitality. From another point of view it may be defined as an attempt to create an environment which enables and encourages all the workers to be and to do their best.

Welfare work must consider the following factors in industrial life: The question of constant work and a satisfactory and adequate wage; the effect of the length of the day not only on the output, but its effect on the worker; an opportunity for adequate and thorough rest; adequate attention to questions of heating, lighting, ventilation; the prevention of accidents and industrial diseases; the prevention of conditions which cause headaches, and eye strain; ample cloak room and lavatory facilities for drying wet things, and the maintenance of a high standard of cleanliness and tidiness. Provision should also be made for obtaining good food at reasonable prices, which may be eaten in comfort and under pleasant surroundings. Medical and dental care, first aid, and rest rooms should be provided. Recreation facilities should be furnished and the play, organized. Sick-clubs, savings-clubs, and pension funds should be organized. An opportunity should be provided for the hearing of complaints and grievances, and these should be settled amicably. Everything should be done to maintain the satisfactory state of mind of the worker. (*M. P. H.*)

Public Health Laboratory Notes.

Abstracts by Arthur Lederer, M. D.

Labeling of Microscopical Slides in Staining Technique.—The method of making the ink may be stated briefly as follows: 15 g. of best cabinet-makers' glue are dissolved at low temperature in 100 cc. of water in a clear glass bottle. To this is added an excess of crystals of potassium dichromate and the mixture is exposed for a week or more to strong light, after which it is filtered. India ink is rubbed into this "stock solution," a slate ink cup or grinder being employed. A little of the solution is poured into the cup and a stick of India ink is applied, the rubbing being done with a circular motion. When sufficient blackness is obtained, the ink is removed with a dropper to a small bottle; the operation is repeated with a new supply of stock solution until a sufficient quantity of ink is accumulated. A supply sufficient for several years' use can be made in this way in the course of an hour or two. The ink will keep indefinitely if care is taken to prevent evaporation. It may best be kept in a small narrow-neck balsam bottle with ground joint, the joint being further sealed with a thin coating of vaseline. The label end of the slide should be clean and free from fixative, when the ink will flow freely. An ordinary clean, medium-pointed steel pen may be used. The ink will dry thoroughly in a few minutes at ordinary room temperature, after which the slides may be passed through the alcohols, stains, water and xylol without deterioration of the label.—Chas. S. Otis, *Science, 47, 219 (1918).*

✠

Canadian Standard Methods of Water Analysis.—The Canadian Public Health Association, according to the *Public Health Journal* for February, 1918, has adopted the 1917 Standard Methods of Water Analysis recommended by the American Public Health Association, with the following amendments:

1. That the soap method for determining hardness be made at 20° C.

2. That the Winkler method for determining dissolved oxygen should only be tentatively accepted, pending further study of the Lancaster and Bonham method, and the Miller method.

3. That the ortho-tolidine method for estimating free chlorine be eliminated.

4. That all solid media used for bacteriological purposes be clarified with 5 gms. egg albumin per liter.

4. That for bacterial counts, agar or gelatine may be used, when incubated at 20° C. for 48 hours. The 37° count on agar after 24 hours' incubation is also to be made.

5. It was not decided which medium might be considered the best presumptive test medium. It was tentatively decided that all fermentative tubes showing less than 10 per cent gas after 48 hours' incubation, should be regarded as negative, particularly if there was no apparent, active formation of gas at the time.

6. Whenever practicable, partial confirmatory tests should be made on positive presumptive tests. The media recommended are litmus lactose agar, Endo's medium, or neutral red bile salt agar. Recommendations for the final confirmatory tests are postponed pending further study of the Voges-Proskauer reaction, gas production in saccharose broth, and indol production in peptone water.

The committee were A. Bernier, A. V. De Laporte, J. G. Fitzgerald, Heber C. Jamieson, M. H. McCrody, and Joseph Race (Chairman).

(*M. P. H.*)

✠

The Use of Larger Quantities of Blood Serum in the Wassermann Reaction.—With larger quantities of serum a higher percentage of positive results is obtained. Glycerol is anticomplementary; the anticomplementary action may be overcome by increasing the quantity of amboceptor. Unconditional negative results should not be reported unless fairly large quantities of serum were used in the test.—E. H. Ruediger, *Jour. Infect. Dis. 22, 205 (1918).*

✠

Microscopic Method of Counting Bacteria for All Grades of Milk.—The method is based on the fact that a suspension of aluminum hydroxide readily collects the bacteria in milk and that the centrifuge is able to throw down the aluminum hydroxide containing the bacteria

to one end of the centrifuge tube leaving the fat, casein, and water very largely behind. The aluminum hydroxide is readily transferred to a glass slide and dried down. As aluminum hydroxide shrinks to a very considerable degree on drying a thin microscopic film is made possible. The hydroxide has slight affinity for methylene blue and on washing with water a clear field is obtained. About 95 per cent of the bacteria in the average sample of milk appear in the hydroxide thrown down by centrifugalization.—Paul W. Allen, *Jour. Infect. Dis., 22, 245 (1918).*

✠

Disinfection of Water With Calcium Hypochlorite.—The disinfectant action of hypochlorite is independent of the concentration of the available chlorine. It does not depend on the length of time the chlorine acts. This reaction process is not an oxidation but a chlorine resorption. The time of killing is dependent on the resistance of the bacteria. The action of calcium hypochlorite does not depend on the time of neutralization of the chlorine; it acts long after neutralization has occurred. In the presence of organic substances the active chlorine concentration is decreased. The disinfecting action of the calcium hypochlorite cannot be reckoned chemically, but must be determined experimentally for a given set of conditions. Its disinfection value is increased by fractional addition. In this case, instead of an action of concentration there is an action of dynamic accumulation.—Hans Lager, *Ztschr. f. Hyg., 81, 296; Chem. Zentralbl., 11, 354 (1916); Chem. Abstr., 12, 394 (1918).*

✠

Blood Charcoal as a Disinfectant of Small Quantities of Water.—A report of experiments on adsorption of microörganisms from contaminated water by animal charcoal. The water is shaken with animal charcoal and filtered through paper. A clear filtrate is generally bacteria-free; charcoal passing through carries germs with it. Charcoal cannot be used for removing bacteria from milk, blood serum, or other colloids, as the colloids are adsorbed more than the bacteria. Adsorption of bacteria by charcoal is selective; cocci are adsorbed more readily than typhoid bacteria, and the latter more than B. coli.—G. Salus, *Wien. klin. Wchnschr., 29, 846 (1916); Chem. Zentralbl., 11, 674 (1916); Chem. Abstr., 12, 395 (1918).*

✠

Serum Veal Agar: a Dependable Substitute for Ascitic or Blood Agar.—Cultures of *diplococcus pneumoniæ* grow as well on serum veal agar after the second generation as on whole blood agar, and far better than on ascitic agar. These cultures lived longer on serum veal agar at refrigerator temperatures without transplanting, than on whole blood agar or ascitic agar. After two weeks, four out of sixteen cultures on whole blood agar and ten out of sixteen on ascitic agar were dead, while all on serum veal agar were alive after seventeen days, and grew well when transplanted on the same media. Cultures of streptococci grew as well and lived as long on serum veal agar as on whole blood agar and better than on ascitic agar. Serum veal agar (veal agar, 2 per cent peptone, neutral, plus normal horse serum) can be used for maintaining cultures of most organisms ordinarily kept on ascitic or whole blood agar.—N. S. Ferry and Arlyle Noble, *Jour. Lab. and Clin. Med., 3, 295 (1918).*

✠

Glycerin in Examining Feces for Typhoid Bacilli.—The use of 30 per cent glycerin in physiologic sodium chlorid solution as a medium for feces for delayed examination has been recommended by Teague and Clurman. For the past year the diagnostic laboratory of the Massachusetts State Department of Health has employed an outfit containing this solution for specimens sent through the mail. The assumption has been that better results are obtained by streaking fresh material, if it is possible to obtain it, at once, or after emulsifying it in broth, on Endo plates or some other selective medium after incubating the emulsion for an hour or two at 37 C. It was noted that specimens of feces sometimes fail to show typhoid bacilli if plated while fresh or after broth enrichment, but after from twelve to twenty-four hours in glycerin show typhoid bacilli in considerable numbers. A specimen from a typhoid carrier received recently gave negative results on plates made directly from specimens of feces and after incubation in broth, but showed many typhoid bacilli after incubation in 30 per cent glycerin for eighteen hours. Plates made from the glycerin suspension showed very few

colon bacilli as compared with those from the fresh material or a broth suspension. The advantage of the glycerin would appear to be its marked inhibitory action on B. coli and its almost negative effect on B. typhosus.—Edith A. Beckler, *Jour. A. M. A., 70, 768 (1918).*

✱

A New and Efficient Substitute for "Nutrose."—The object of this investigation was to prepare an efficient substitute for the patent German foodstuff known as "Nutrose," used in bacteriological media. A similar substance was prepared from casein, peanut flour and Na_2CO_3. It is of great nutritive value. On account of its high protein content, and relative small amount of carbohydrates present, this preparation is particularly useful for making bread for diabetic patients. This preparation when used for making the Conradi-Drigalski medium gives a transparent medium on which organisms of the typhoid-coli group grow rapidly. This property of stimulating the growth of organisms appears to be due to the presence of a vitamine associated with the globulin contained in the peanut flour.—R. L. Mackenzie Wallis, *Agr. J. India 12, 621 (1917); Chem. Abstr., 12, 493 (1918).*

✱

Value of Triple Typhoid Vaccine.—In his experience with the triple vaccine Lyons has found it advisable to begin with 0.25 cc. for the first dose, advancing the dosage to 0.5 cc. for the second and 1 cc. for the third dose. In civil work this is a good plan, as many individuals are discouraged from taking their second and third doses if they happen to have some reaction with the first dose. During the past six years Lyons has inoculated over 150 persons with a mixed vaccine. Of these he has been able to follow fifty from periods of one to six years. None have developed any infections of enteric type. His own blood was examined a few weeks ago. It still agglutinated B. typhosus up to 1:100 dilution in forty-five minutes, but no longer agglutinated paratyphoid "A" and "B". This is quite an unusual reaction after a lapse of over six years, and possibly depends on the fact that the last dose was a large one containing 1,000 millions of each organism. This brings out an interesting point that while the dosage of each organism was the same, the highest agglutination titer was always against B. typhosus. Lyons is of the opinion that if such a vaccine were generally employed in civil life, the morbidity from fevers of unknown origin and many so-called typhoids with negative bloods would be greatly lessened.—R. Lyons, *Southern Med. Jour., 11, 89 (1918); Jour. A. M. A., 70, 733 (1918).*

✱

Contagious Period of Whooping-Cough.—Comby cites a recent publication to the effect that the sputum from 156 Copenhagen children with whooping-cough showed the presence of the Bordet-Gengou bacillus in all who had been coughing for two weeks; in two-thirds of those who had had the paroxysmal cough for two weeks; in one-third after three weeks; only in three children out of thirty-six in the fourth week; and only once later than this. The findings confirmed the old assumption that whooping-cough is not contagious after the fifth week. Children can thus be sent back to school after four weeks of the paroxysmal cough, even although it still keeps up. Agglutination was found positive in twenty-two of the twenty-three cases tested, while it was constantly negative in 102 healthy controls. It usually appeared at the third week and was constant by the fifth week up to several months. Comby's own experience confirms that whooping-cough is contagious only in the first two or three weeks, and he reiterates that there is no use in imposing isolation after the fourth week from the first symptoms.—J. Comby, *Arch. de med. d. enfants, 20, 593 (1917); Jour. A. M. A., 70, 737 (1918).*

✱

Toxin Extracted from Tubercle Bacilli.—Sivori and Jauregui report that their long research has resulted in the extraction from tubercle bacilli of a toxin which responds to all the tests for peptone. It kills guinea-pigs weighing 500 gm. in six days, in a subcutaneous dose of 0.5 cc. If the animals are prepared with small doses, commencing with 0.1 cc. to a total of 1 cc. in fifteen days, they withstand subcutaneous injection of the otherwise fatal dose of 0.5 cc. without showing any disturbance. The serum of rabbits prepared in this way confers immunity also on other rabbits. Unprepared rabbits die in two hours after injection of 2 cc.; with a dose of 5 cc. rabbits die in one hour, and

with 10 cc. death is practically instantaneous. The authors think that this peptone toxin from tubercle bacilli promises to be useful in serotherapy as its extreme toxicity and the immunity it confers fulfils the desiderata better than anything else known to date. No details are given as to the technic for extracting this "new peptone toxin," as they call it.—L. Sivori and F. Jauregui, *Prensa Medica Argentina*, 4, 235 (1917). *Jour. A. M. A.*, 70, 740 (1918).

✠

Serologic Test of Flour.—Kostyamin obtained a prepared serum from rabbits by injecting them with different flours. He used a solution in six parts saline, filtering it through extra hard Schleicher and Berkefeld filters. The first injection was 15 cc.; the second 20 and the third 30 cc., all at five-day intervals. The animals lost nearly 100 gm. in weight but their blood serum then contained precipitins for the flour used, and it was thus possible to detect admixture of rye, barley, and oatmeal with wheat flour. The most instructive reactions were obtained when the titer of the serum was 1:300 or 1:500. As small admixtures as from 3 to 5 per cent can be thus detected when the serum is left in contact with the flour for thirty minutes. The serum seems to keep well in fused glass tubes at 4 or 6 degrees C. Flour from peas, beans and rice is also used at times to adulterate wheat flour, but he did not include them in his research.—N. N. Kostyamin, *Russkiy Vrach*, 16, 518 (1917); *Jour. A. M. A.*, 70, 741 (1918).

✠

Sand Test for Typhoid Bacilli Carriers.—Borzone and Carbone report the successful use of Carbonell's modification of the sand tube for differentiation of the mire motile typhoid bacilli. The sand test was described in *The Jour. A. M. A.*, April 15, 1916, p. 1281. Carbonell's modification consists in using an outer tube, 18 cm. long by 3.5 cm. in diameter and an inner tube 14 cm. long by 2 cm. in diameter. The lower end of the inner tube tapers and curves up, and it is filled with sand to a height of 4 cm. The outer tube is partly filled with bouillon containing 1 per cent glucose and a few drops of neutral red. The sand soaks up the bouillon and the diluted specimen of feces is placed only in the inner tube. In from sixteen to eighteen hours the bouillon in the outer tube will contain typhoid bacilli in case of positive findings. In thirty suspected carriers, by this means the typhoid bacillus was detected in twenty-three and the paratyphoid B in three. Numerous tests with colon, paracolon, anthrax and dysentery bacilli and staphylococci confirmed the reliability of the differential findings.—R. A. Borzone and J. M. Carbone, *Semana Medica, Buenos Aires*, 24, 569 (1917); *Jour. A. M. A.* 70, 895 (1918).

Industrial Hygiene and Sanitation.

Abstracts prepared by Drs. E. R. Hayhurst, R. P. Albaugh and P. M. Holmes.

Industrial Hygiene and the Doctor and the Health Officer.—Illustrating with an interesting sketch the work done by the Division of Industrial Hygiene, Harris demonstrates the possibilities of industrial hygiene in the field of preventive medicine. More study of the causes and reporting of industrial diseases by physicians and employers, the teaching of industrial hygiene in the colleges, intensive research work, and closer medical supervision of employees are urged in a set of well-drawn conclusions.—Louis I. Harris, *New York Department of Health, Reprint No. 62*, 12 pp.

The Lighting of Industrial Establishments.—Tuck urges the inauguration of a department of maintenance of artificial lighting equipment in all work places, and gives his personally devised system of maintenance rating. This consists in applying an approximate value denoting the degree of upkeep to conditions causing loss of light, such as dirty lamps, broken or dirty reflectors, etc. An example showing how to determine the efficiency of maintenance, and the method of increasing it to one hundred per cent, is included.—Davis H. Tuck, *U. S. Pub. Hlth. Ser., Reprint 429.*

Collective Agreements on Shop Sanitation.—Agreements between employers and labor organizations, prescribing proper shop sanitation, are increasing. At the present time provisions for sanitary regulations are found in the Massachusetts agreements of bakers, compositors, furworkers, granite cutters and garment workers. Granite cutters have asked the abolition of hand surfacing machines, owing to the ill effect of their use on health. The success of the Joint Board of Sanitary Control of the Garment Trades in New York in establishing proper conditions also shows the results of coöperation between employer, employee and the public.—*Mass. Bur. of Stat.* (Chas. F. Gettemy, Director), *Bulletin No. 121*, pp. 22–24.

✱

Feeblemindedness and Industrial Relations.—Feebleminded individuals, with the exception of the lowest type, are trainable, and can do efficient work if properly supervised and placed at a proper occupation. Such are the conclusions of Rossy who is industrial psychologist at Sing Sing Prison. The emotional instability and tendency to change positions frequently accounts for much of the great expense in the labor problem in industry. Their intellectual inferiority causes many factory accidents. A Mental Hygiene Bureau at industrial concerns where psychological tests could be made for selective purposes would greatly ameliorate the hazards and expense and tend to raise the standards of industry.—C. S. Rossy, *Mental Hygiene*, Vol. II, No. 1, Jan., 1918, pp. 34–52.

✱

A Sanitary Cuspidor.—By the use of a sheet of paper of the proper size and texture, shaped by crinkling the edges to fit the ordinary steel cuspidor (lining it), and using a sheet of paper large enough so that a large rim is provided to bend over the edges and sides of the receptacle, a sanitary cuspidor is made. It is filled with sawdust. The janitors in cleaning the cuspidors remove the entire paper lining containing the sawdust and replace the same anew. The white collar provides a method for attracting the attention of employees to the purpose of the receptacle.—National Safety Council, 208 S. LaSalle St., Chicago. *Service Series No. 606.*

✱

A Novel Sand Blast Room.—The American Museum of Safety, 14 W. 24th St., New York, calls attention to a model in its Museum of a sand blasting device by which the work on small articles is done in a revolving chamber provided with partitions so that while sand blasting is proceeding in one chamber, work which has just been completed in a former chamber can be removed. The worker stands outside of the whole apparatus and looks through a wire-screen. The interior of the chambers is illuminated. A rubber-line slot in the side of each chamber allows for the insertion of the nozzle of the sand blasting hose. —*Safety*, Jan., 1918, pp. 17–19.

✱

Risk and Avoidance of T. N. T. Poisoning.—By a plausible calculation, Rice finds that between 7,000 and 17,000 cases of T. N. T. poisoning, resulting in between 135 and 475 fatalities, will probably occur in American shell loading plants during the production of the 78 million rounds of cannon ammunition so far ordered by the United States government,—unless radical improvements are made in health-conservation practices. The labor turnover, also, at such plants is so great that from 2 to 30 different persons are required for each job during one year's operations. He figures that the T. N. T. health risk might, with reasonable and inexpensive precautions, be reduced 80 to 90 per cent. At a conference of health officials and munition makers held in New York City in December at the request of a subcommittee for the Council of National Defense, munition makers voted down a clause proposed as a humanitarian protection to workers apparently for two reasons: first, that such workers should not be told the real danger as it would make them unduly apprehensive, and secondly, that workers should not be given any memoranda to be used for self-protection of health or as guides to physicians in treatment, because such memoranda might be used by adventuring lawyers as bases for troublesome damage suits. The employers contended that the proper procedure should be to educate all the doctors in the diagnosis and cure of T. N. T. poisoning. The article continues with comment on the insidious character of T. N. T. poisoning with a description of the substance and the methods of its use, the four kinds of poisoning which occur, descriptions of cases of poisoning and the evident inadequacy of medical supervision of workers and the sanitation of the plants discussed. The

author believes that there is the possibility of saving several hundred lives, and, in the concurrent saving of T. N. T., some $4,000,000, in completing the government's order.—Archie Rice, *Monthly Review, U. S. B. of L. S.*, Feb., 1918, pp. 13–35.

✱

Minimum Wage Betters Industrial Welfare and Increases Profits.—The effects of minimum wage regulation of wages, hours and working conditions of women and minors in the fruit and vegetable canning industry of California for the year 1916 were a reduction in the number of children employed from 2,344 in 1914 to 1,092 in 1916 while the minimum wage did not become the maximum but wages were raised even higher than piece rates, while the output for the year was the largest in the history of the state. Hours have also been gradually reduced from year to year until about half of the canners and cutters worked less than 48 hours per week. On the matter of providing seats for women the conclusion is made that there is no good reason why compulsory standing or compulsory sitting should be insisted upon, but that a free choice of position on the part of the worker will reduce fatigue and hence increase output.—Review of *Bull. No. 1, Industrial Welfare Commission, California. Monthly Rev., U. S., B. of L. S.*, Feb., 1918, pp. 138–142.

✱

Big Gain of Labor Output by Health and Safety Measures.—The Employment Managers' Conference at Philadelphia suggested that as much as 60 per cent in output of labor per man could be gained by a rational system of management which would give due regard to the worker's health and safety. The measures advocated had to do with shortening the working day, providing rest periods, advancing piece and time rates, cutting all overtime, re-creating in the employee an interest in the job he is doing and helping him to get the most out of his earnings and his leisure. Among practical plans for reducing labor turnover were mentioned proper selection of employees, adequate wages, steady work, promotion of physical efficiency and good habits, hearing of complaints, provision for pensions, profit sharing, etc. "Bad systems or no systems of handling employees" was put down as the greatest waste in all industries.—*Monthly Review, U. S. B. of L. S.*, Feb., 1918, pp. 173–174.

✱

Labor Camp Conditions.—Hundreds of men live and work under sub-standard conditions, equally deplorable whether considered from the standpoint of their own welfare or their employers' profits. In addition, public health is seriously menaced. These constitute part of the conclusions in a survey of 108 camps in Ohio in the spring of 1917, where 7,772 men were employed. Construction, railroad, factory and mill camps were covered. The report ends with concise suggestions for standards in the general layout and maintenance of labor camps.—*Bull., Industrial Commission of Ohio*, Vol. IV, No. 11, Nov. 27, 1917, 22 pp.

✱

Hookworm Infection in Mines.—A bibliography on this subject has been prepared by the Rockefeller Foundation and is given on pages 45–47 of *Bulletin 139, U. S. Bur. of Mines*, entitled Control of Hookworm Infections at the Deep Gold Mines of the Mother Lode, California.

✱

Pleurisy in Farm Workers.—This entire number of the *Paris Medicale* (Jan. 5, 1918, 8, No. 1) is devoted to diseases of the lungs and pleura. Braillon (p. 23) calls attention to the characteristic location of a pleural effusion in the front upper part of the pleura in men who bend over at their work, such as tillers of the soil."—*Jour. A. M. A.*, March 16, 1918, p. 817.

✱

The Dust Hazard in Certain Industries.—The results of investigations on dusts of various types—Portland cement, flint, steel grindings, asbestos, pottery, plush, blankets and carpets, felt hats and cigars—as well as that of country and city air—are given in detail and with illustrations by Miller and Smyth of Philadelphia. The number of particles per unit volume of air, their approximate size, the influence of atmospheric humidity, of exhaust ventilation and the amount of each that actually reaches the lungs of those exposed to these various dusts are stated. A modified Palmer dust-counting apparatus was used. Outdoor country air showed 20,000 particles per cubic foot and outdoor city air about 50,000, the latter high in the smallest type of particle. As much

as 15 million particles per cubic foot were counted in Portland cement which proved the maximum of all types. The great value of wet processes in handling dusty work was easily attested. It was found that as humidity increases the percentage of the larger particles of dust decreases while the minute ones correspondingly increase. Based on Lehmann's findings that about one-third of inhaled dust reaches the lungs, it was calculated that the average cement worker inhales a half gram of dust per day,—less than eleven years being required for one pound to gain entrance. Again Lehmann found that in mouth breathing 80 per cent of dust reaches the lungs, hence such workers are more quickly saturated. Dust removal at the point of production not only greatly decreases air dustiness, but particularly removes the smaller particles.—T. Grier Miller and Henry Field Smyth, *Jour. A. M. A.*, March 2, 1918, pp. 599–604.

✠

A Self-Supporting Industrial Dental Clinic.—The Joint Board of Sanitary Control of the Ladies Garment Workers' Union in New York established a dental clinic for the members of the union on May 7, 1917. This was because the established medical clinic had disclosed the facts that at least 50 per cent of the workers suffered from bad, diseased and decayed teeth; that very few were able to get decent dentistry at moderate charges; and that workers paid large sums for defective work on their teeth, much of which only hid defects by covering them with gold crowns and bridges. In the first eight months (to December 31) 958 patients were given 3,930 treatments for their teeth. The total cost of the clinic paraphanalia was $3,545.05. Patients are charged $2.00 per hour as the basic charge and $2.50 per hour where expensive materials are used. Extractions cost 50 cents and local anasthesia $1.00. X-rays cost 75 cents for single films and 50 cents for more than one. Plate work is charged for at from $12.00 to $15.00 up. The clinic does all ordinary work. It is open from 10.00 a. m. to 9.00 p. m. daily except on Fridays and Saturdays, when it closes at 7.00 p. m. and 6.00 p. m., respectively. Summer hours are shorter. The clinic employs one full-time dentist, working fifty hours per week, at a salary of $50.00 per week, and several part-time dentists paid at the rate of $1.00 per hour. The chief difficulties so far encountered have been (a) to educate the workers in discarding bridges and crown work, (b) persuading them not to allow sound, or even slightly defective teeth, to be covered with gold crowns, (c) to educate workers to keep their appointments, and (d) difficulty in filling the time of the dentist during the day-time,—usually overcrowded in the evening.—Geo. M. Price, M. D., Director, the Joint Board, *Hospital Management*, March, 1918, pp. 32–33.

✠

More Mysterious Deaths Prove to be Gas Poisoning.—In instances of carbon monoxide poisoning, even although all of the gas may have left the blood of the victim, so that tests for it are negative (thus the *prima facie* evidence gone), still the asphyxia produced by the experience may cause death through injury to the central nervous system. These are the conclusions of J. Bock (*Hospitalstidende*, Copenhagen, Jan. 2, 1918, 61, No. 1) who studied cases of poisoning from a defective stove in which the body of the husband was found on the floor, and two-thirds of the hemoglobin transformed to carbon monoxide hemoglobin. The body of the wife was in a closed adjoining room and only one-fifth of her hemoglobin had been thus transformed. Bock assumed that she originally had been poisoned as deeply as her husband, but that she sought the bedroom, and her blood gradually threw off most of the gas. Had she continued to breathe for a short time longer and then died, nothing would have been found at necropsy to explain her death. A baby found near the man's body showed no signs of poisoning, witnesses testifying that it was usually kept in an adjoining room, and it had probably not been brought out into the room with the stove until late. Bock experimented on animals in connection with the instance and found that the animals died even although all the carbon monoxide had been thrown off.—Abstracted from review by *Jour. A. M. A.*, March 16, 1918, p. 820.